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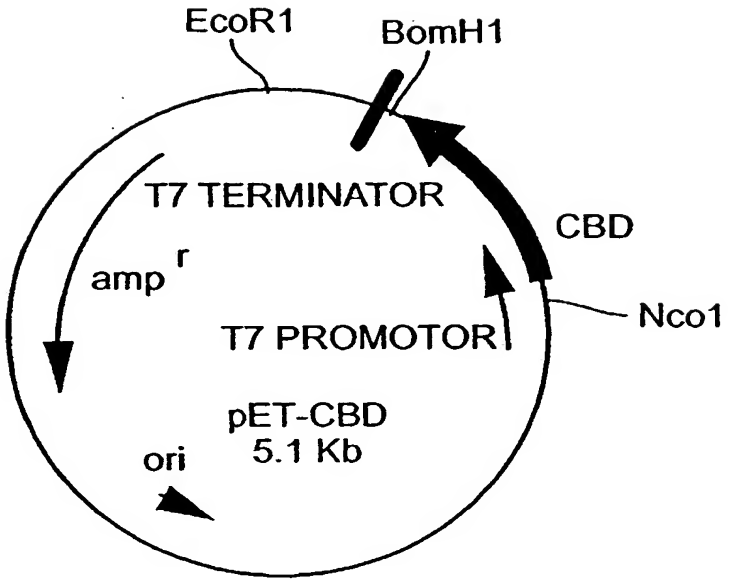

EcoR1
BomH1
T7 TERMINATOR
CBD
amp r
Nco1
T7 PROMOTOR
pET-CBD
5.1 Kb
ori

Fig. 1a

```
          10         20         30         40         50
GCA GCG ACA TCA TCA ATG TCA GTT GAA TTT TAC AAC TCT AAC AAA TCA GCA CAA
CGT CGC TGT AGT AGT TAC AGT CAA CTT AAA ATG TTG AGA TTG TTT AGT CGT GTT
Ala Ala Thr Ser Ser Met Ser Val Glu Phe Tyr Asn Ser Asn Lys Ser Ala Gln>
                                   10

      60         70         80         90         100
ACA AAC TCA ATT ACA CCA ATA ATC AAA ATT ACT AAC ACA TCT GAG AGT GAT TTA
TGT TTG AGT TAA TGT GGT TAT TAG TTT TAA TGA TTG TGT AGA CTG TCA CTA AAT
Thr Asn Ser Ile Thr Pro Ile Ile Lys Ile Thr Asn Thr Ser Asp Ser Asp Leu>
  20                                   30

110        120        130        140        150        160
AAT TTA AAT GAC GTA AAA GTT AGA TAT TAT TAC ACA AGT GAT GGT ACA CAA GGA
TTA AAT TTA CTG CAT TTT CAA TCT ATA ATA ATG TGT TCA CTA CCA TGT GTT CCT
Asn Leu Asn Asp Val Lys Val Arg Tyr Tyr Tyr Thr Ser Asp Gly Thr Gln Gly>
             40                                   50

      170        180        190        200        210
CAA ACT TTC TGG TGT GAC CAT GCT GGT GCA TTA TTA GGA AAT AGC TAT GTT GAT
GTT TGA AAG ACC ACA CTG GTA CGA CCA CGT AAT AAT CCT TTA TCG ATA CAA CTA
Gln Thr Phe Trp Cys Asp His Ala Gly Ala Leu Leu Gly Asn Ser Tyr Val Asp>
                   60                                   70

  220        230        240        250        260        270
AAC ACT AGC AAA GTG ACA GCA AAC TTC GTT AAA GAA ACA GCA AGC CCA ACA TCA
TTG TGA TCG TTT CAC TGT CGT TTG AAG CAA TTT CTT TGT CGT TCG GGT TGT AGT
Asn Thr Ser Lys Val Thr Ala Asn Phe Val Lys Glu Thr Ala Ser Pro Thr Ser>
                   80                                   90
```

Fig. 1b

```
          280        290        300        310        320
ACC TAT GAT ACA TAT GTT GAA TTT GGA TTT GCA AGC GGA GCA GCT ACT CTT AAA
TGG ATA CTA TGT ATA CAA CTT AAA CCT AAA CGT TCG CCT CGT CGA TGA GAA TTT
Thr Tyr Asp Thr Tyr Val Glu Phe Gly Phe Ala Ser Gly Ala Ala Thr Leu Lys>
                                  100
     330        340        350        360        370
AAA GGA CAA TTT ATA ACT ATT CAA GGA AGA ATA ACA AAA TCA GAC TGG TCA AAC
TTT CCT GTT AAA TAT TGA TAA GTT CCT TCT TAT TGT TTT AGT CTG ACC AGT TTG
Lys Gly Gln Phe Tle Thr Ile Gln Gly Arg Ile Thr Lys Ser Asp Trp Ser Asn>
  110                                  120
380        390        400        410        420        430
TAC ACT CAA ACA AAT GAC TAT TCA TTT GAT GCA AGT AGT TCA ACA CCA GTT GTA
ATG TGA GTT CTG TTA CTG ATA AGT AAA CTA CGT TCA TCA AGT TGT GGT CAA CAT
Tyr Thr Gln Thr Asn Asp Tyr Ser Phe Asp Ala Ser Ser Ser Thr Pro Val Val>
          130                                  140
     440        450        460        470        480
AAT CCA AAA GTT ACA GGA TAT ATA GGT GGA GCT AAA GTA CTT GGT ACA GCA CCA
TTA GGT TTT CAA TGT CCT ATA TAT CCA CCT CGA TTT CAT GAA CCA TGT CGT GGT
Asn Pro Lys Val Thr Gly Tyr Ile Gly Gly Ala Lys Val Leu Gly Thr Ala Pro>
                    150                                  160
```

Fig. 1c

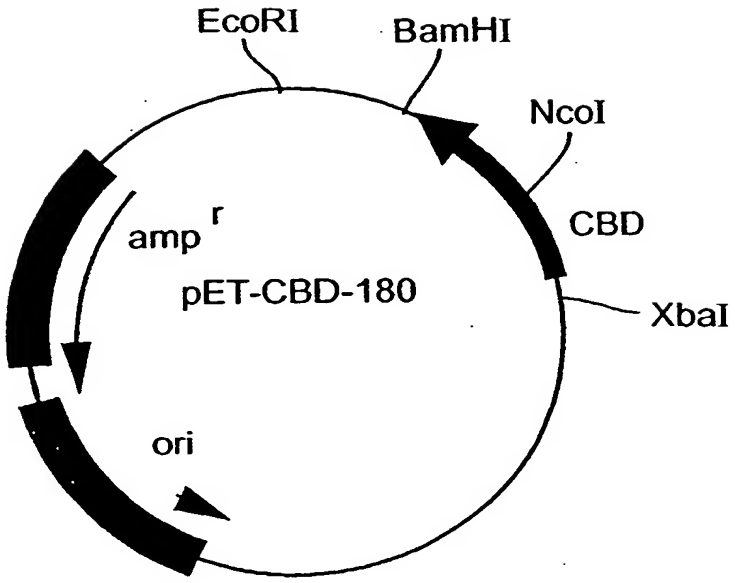


Fig. 1d

CBD - 180 CONTAINS 180 AMINO ACIDS OF CBD_{clos}

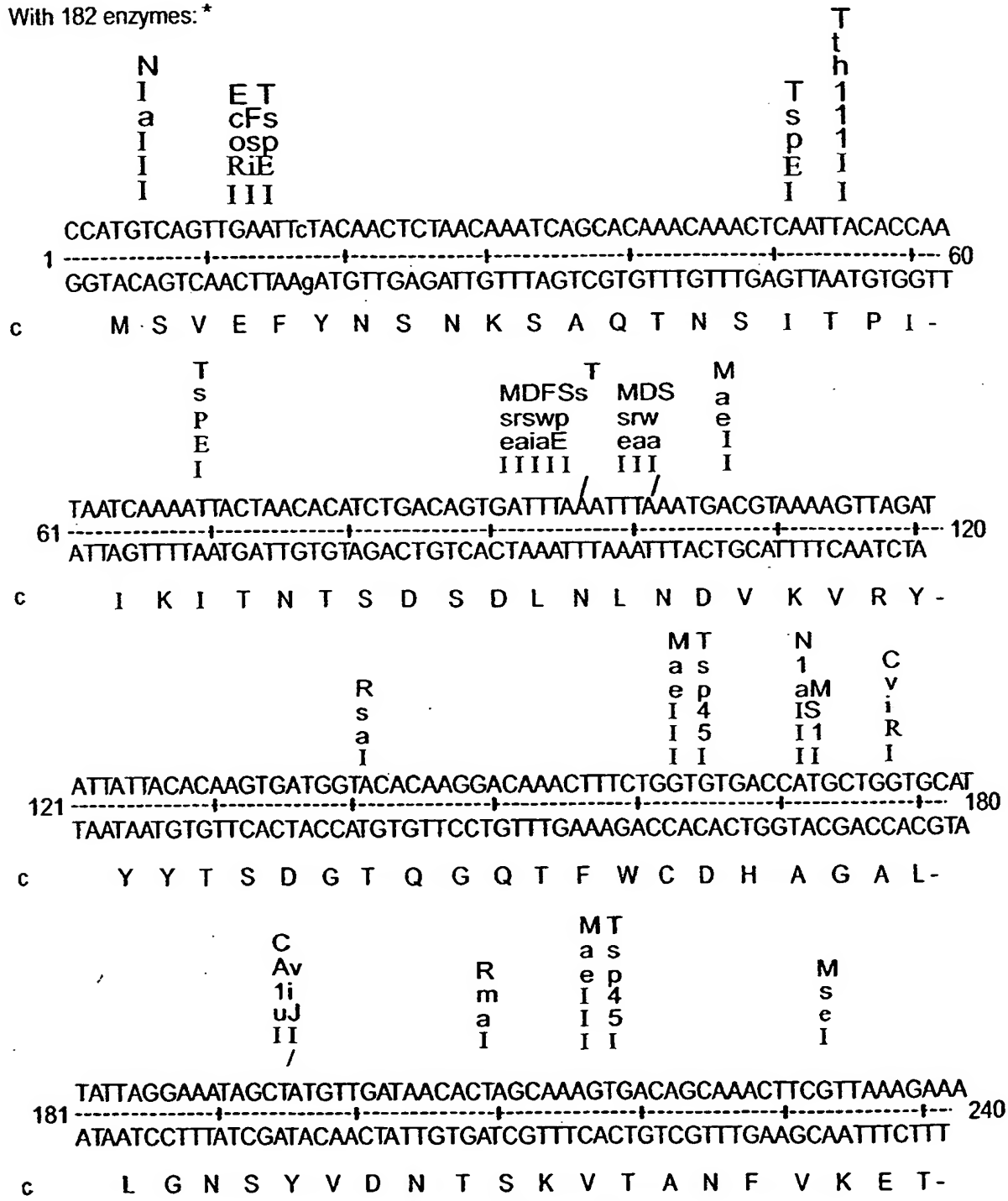
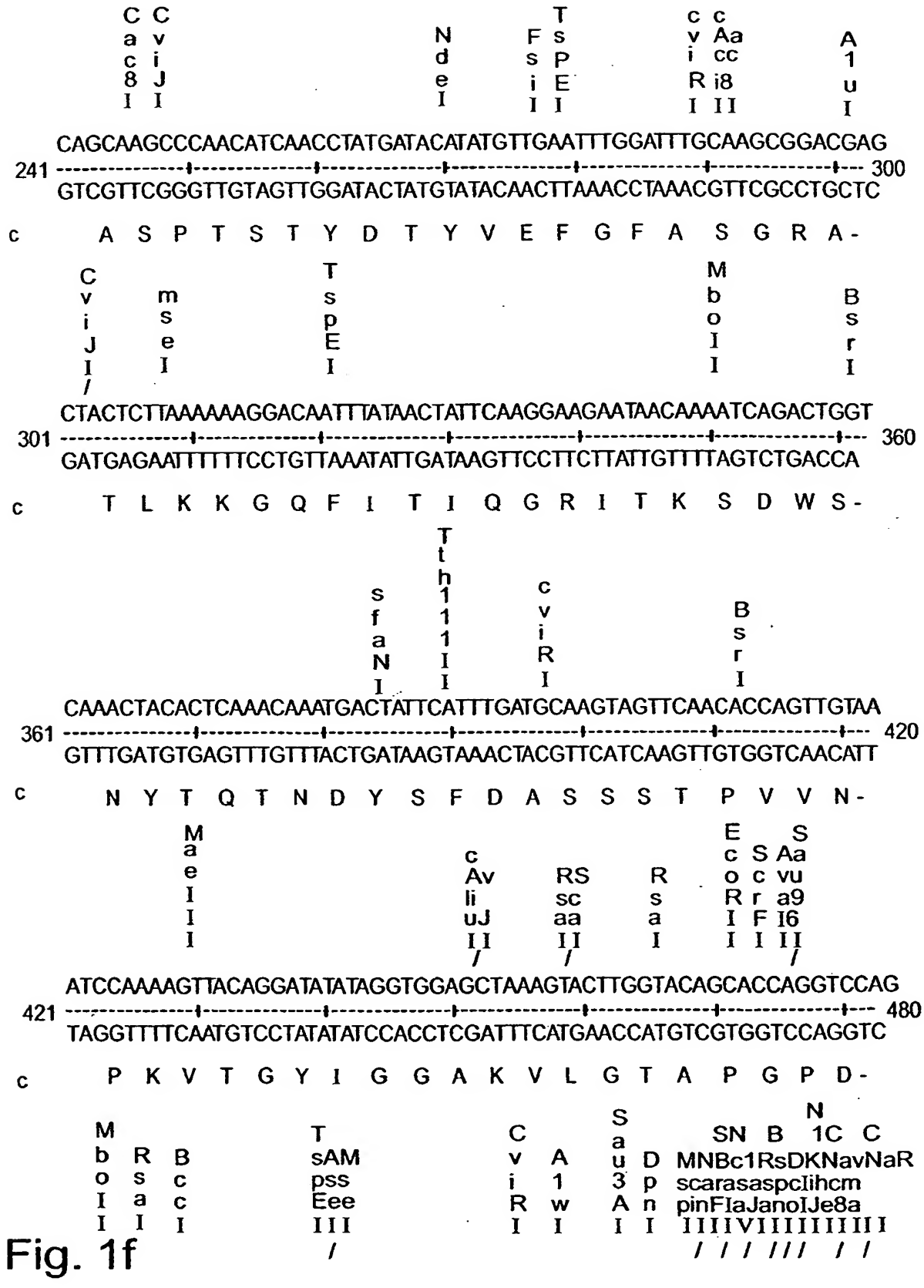


Fig. 1e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c A S P T S T Y D T Y V E F G F A S G R A-
CTACTCTTAAAAAAGGACAATTTATAACTATTCAAGGAAGAATAACAAAATCAGACTGGT
301 360
GATGAGAATTTTTTCCTGTTAAATATTGATAAGTTCCTTCTTATTGTTTTAGTCTGACCA
c T L K K G Q F I T I Q G R I T K S D W S-
CAAACTACACTCAAACAAATGACTATTCATTTGATGCAAGTAGTTCAACACCAGTTGTAA
361 420
GTTTGATGTGAGTTTGTTTACTGATAAGTAAACTACGTTCATCAAGTTGTGGTCAACATT
c N Y T Q T N D Y S F D A S S S T P V V N-
ATCCAAAAGTTACAGGATATATAGGTGGAGCTAAAGTACTTGGTACAGCACCAGGTCCAG
421 480
TAGGTTTTCAATGTCCTATATATCCACCTCGATTTCATGAACCATGTCGTGGTCCAGGTC
c P K V T G Y I G G A K V L G T A P G P D-

Fig. 1f

```
    ATGTACCATCTTCAATAATTAATCCTACTTCTGCAACATTTGATcccggtaccatggCTA
481 ----------+----------+----------+----------+----------+----------+--- 540
    TACATGGTAGAAGTTATTAATTAGGATGAAGACGTTGTTAAACTAgggccatggtaccGAT
c       V  P  S  S  I  I  N  P  T  S  A  T  F  D  P  G  T  M  A  S -

          N                                  S
          1                                  BB Na
    S     aBM     B          A               AsD1u
    t     Icm     S          1               mtpa3
    Y     Ige     r          w               HYnIA
    I     III     I          I               IIIVI
    /     /                                  /  /

    GCATGACTGGTGGACAGCAAATGGGTCGGATCC
541 ----------+----------+----------+-------- 573
    CGTACTGACCACCTGTCGTTTACCCAGCCTAGG
c       M  T  G  G  Q  Q  M  G  R  1  -
```

Fig. 1g

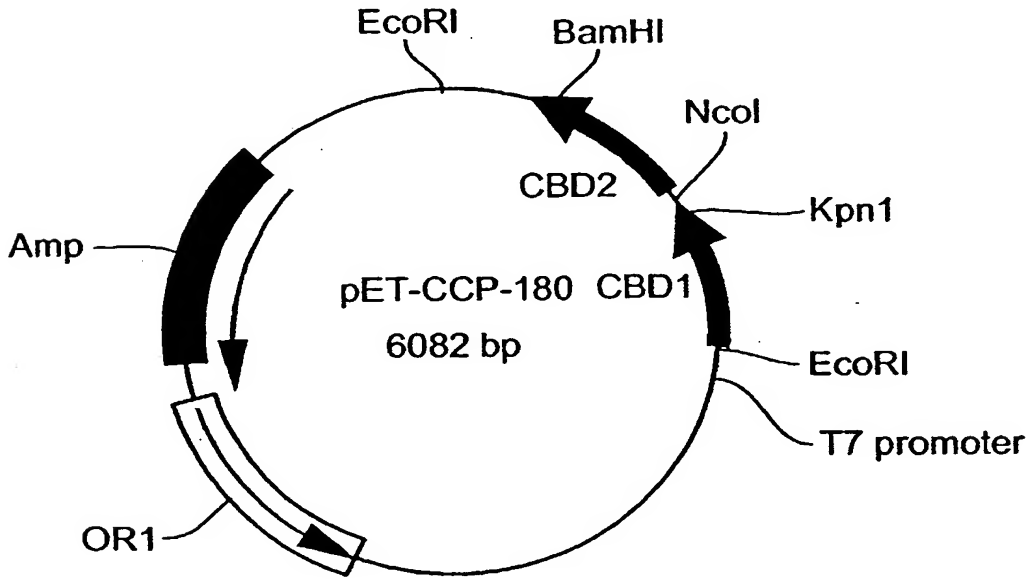


Fig. 2a Map of pET-CCP

MAP OF CCP

CCP = CBD CROSS LINKER PROTEIN, CONTAIN TWO CBDs FUSED TOGETHER.

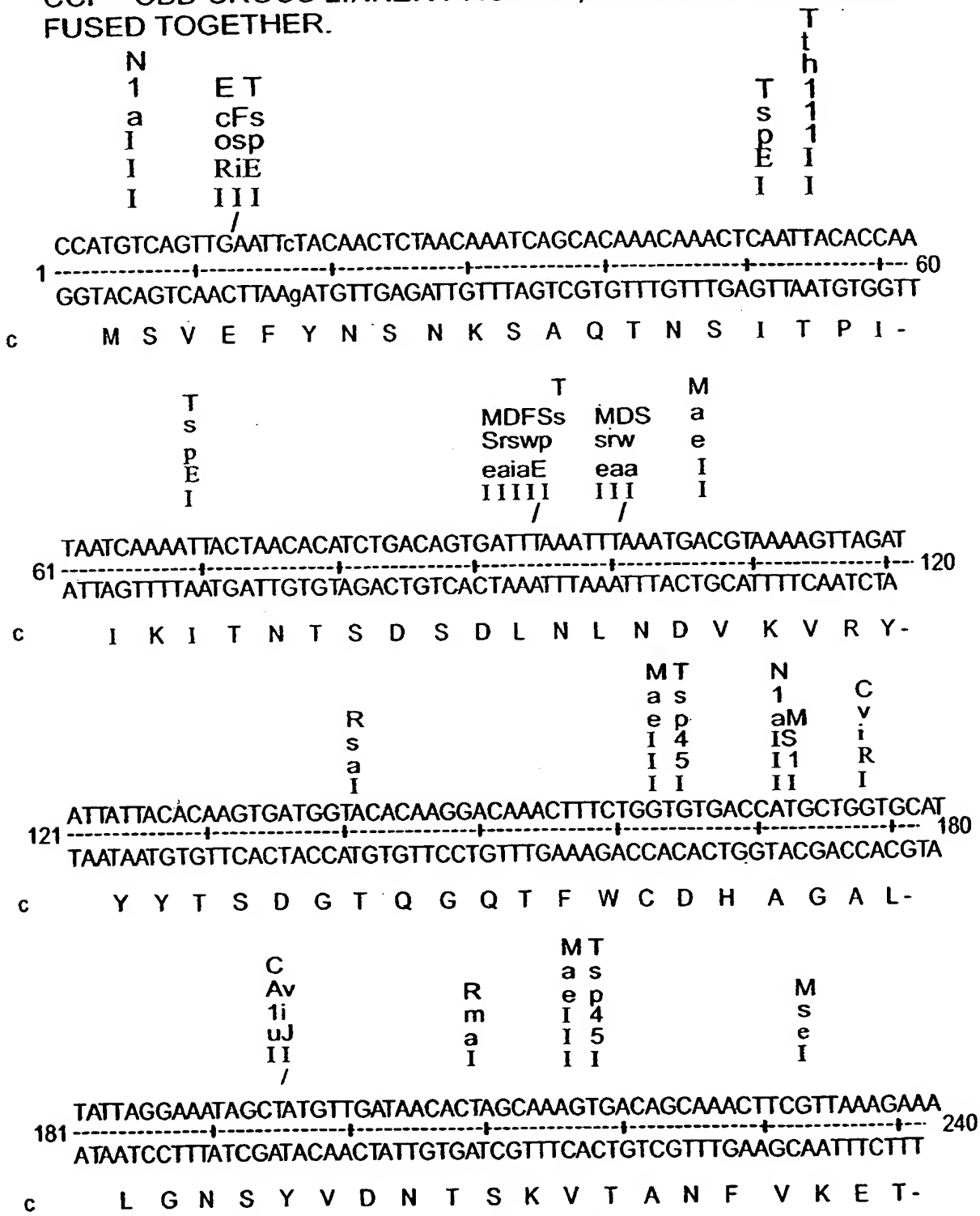
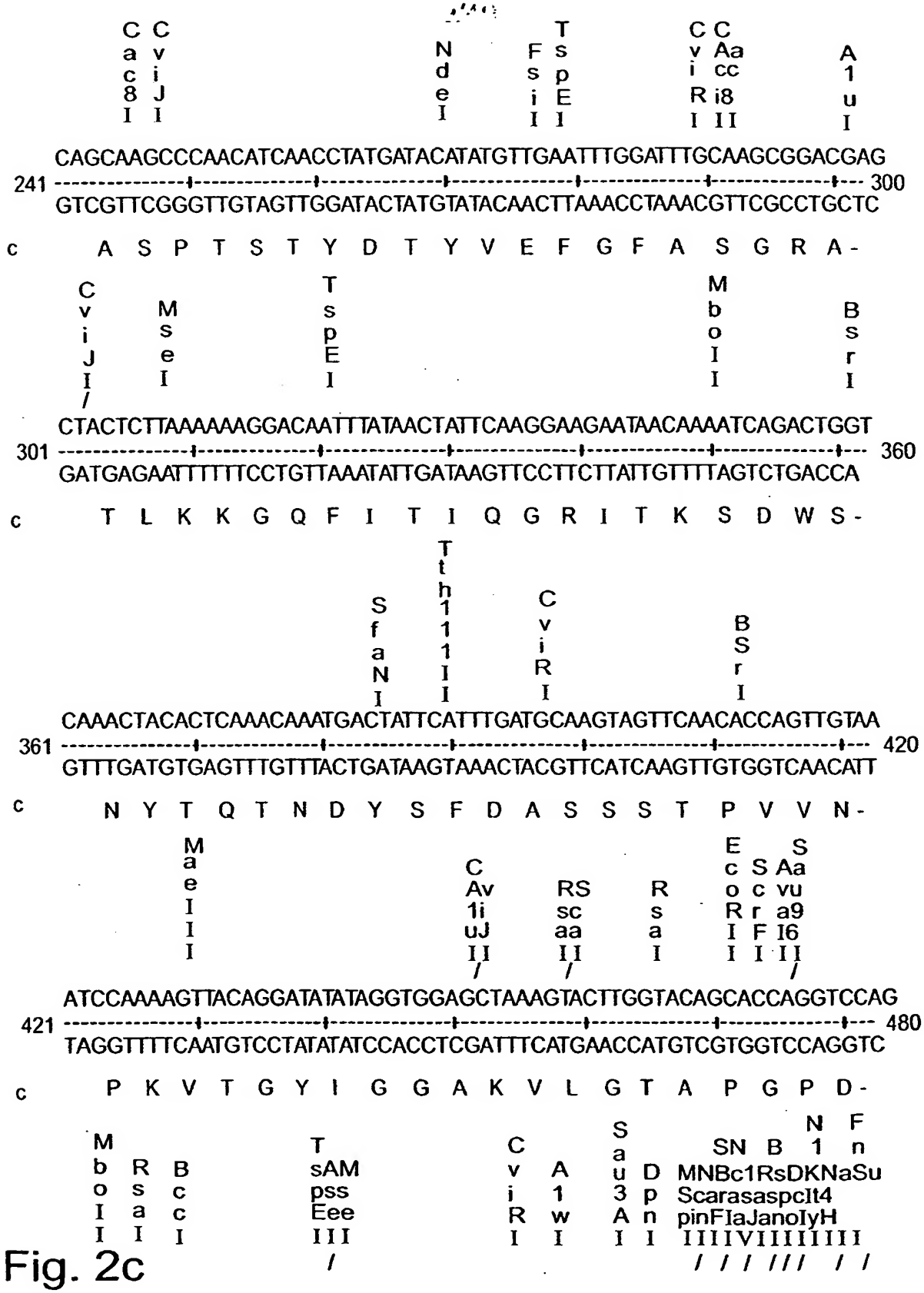


Fig. 2b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c A S P T S T Y D T Y V E F G F A S G R A-
CTACTCTTAAAAAAGGACAATTTATAACTATTCAAGGAAGAATAACAAAATCAGACTGGT
301 360
GATGAGAATTTTTTCCTGTTAAATATTGATAAGTTCCTTCTTATTGTTTTAGTCTGACCA
c T L K K G Q F I T I Q G R I T K S D W S-
CAAACTACACTCAAACAAATGACTATTCATTTGATGCAAGTAGTTCAACACCAGTTGTAA
361 420
GTTTGATGTGAGTTTGTTTACTGATAAGTAAACTACGTTCATCAAGTTGTGGTCAACATT
c N Y T Q T N D Y S F D A S S S T P V V N-
ATCCAAAAGTTACAGGATATATAGGTGGAGCTAAAGTACTTGGTACAGCACCAGGTCCAG
421 480
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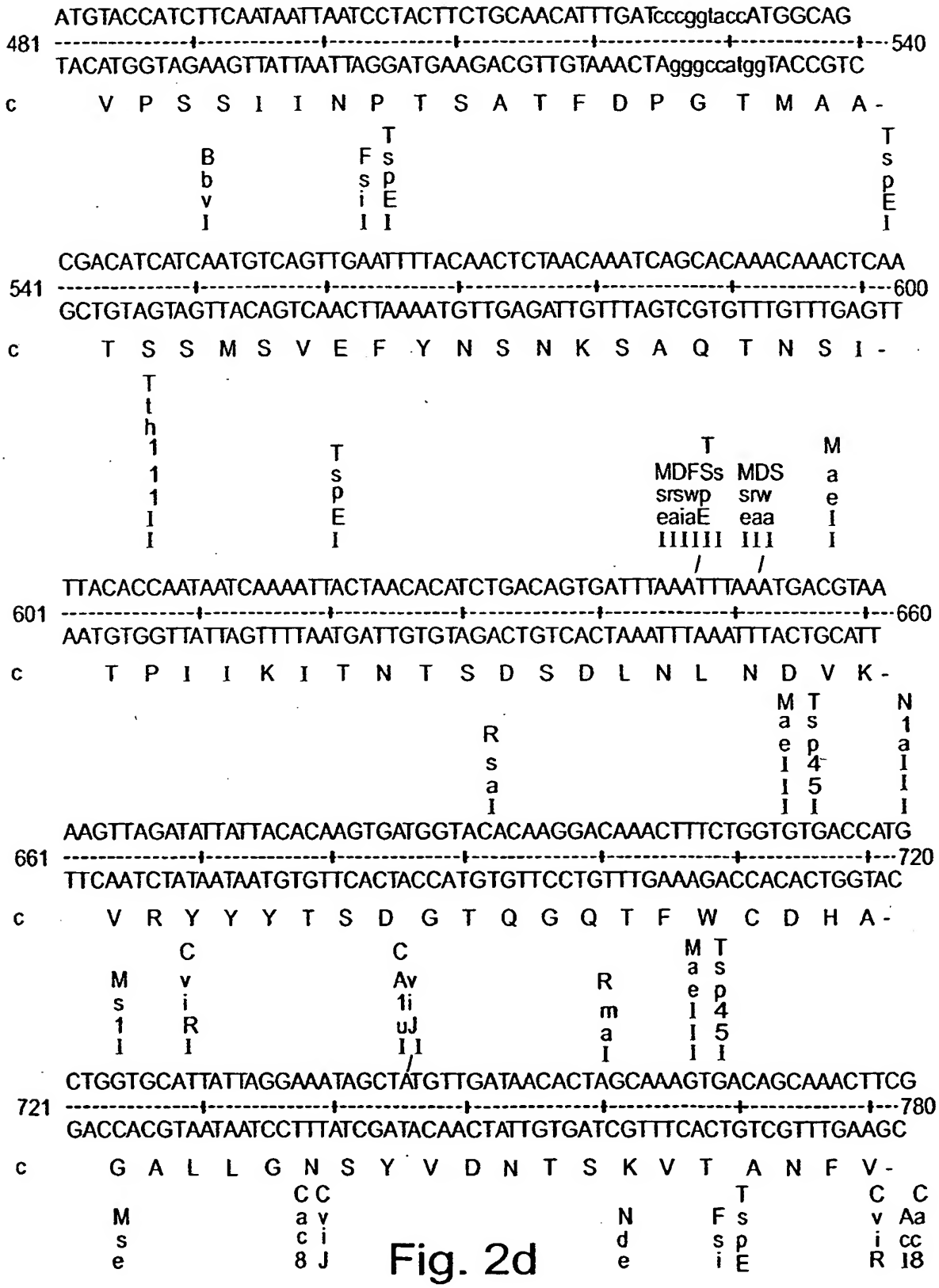
c P K V T G Y I G G A K V L G T A P G P D-

Fig. 2c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540
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c V P S S I I N P T S A T F D P G T M A A-
BbvI
FsiI
TspEI
TspEI
CGACATCATCAATGTCAGTTGAATTTTACAACTCTAACAAATCAGCACAAACAAACTCAA
541
600
GCTGTAGTAGTTACAGTCAACTTAAAATGTTGAGATTGTTTAGTCGTGTTTGTTTGAGTT
c T S S M S V E F Y N S N K S A Q T N S I-
TthH111I
TspEI
TMDFSs srswp eaiaE IIIIII
MDS srw eaa III
Ma eI I
TTACACCAATAATCAAAATTACTAACACATCTGACAGTGATTTAAATTTAAATGACGTAA
601
660
AATGTGGTTATTAGTTTTAATGATTGTGTAGACTGTCACTAAATTTAAATTTACTGCATT
c T P I I K I T N T S D S D L N L N D V K-
RsaI
MaeI
TspI45
N1aII
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661
720
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c V R Y Y Y T S D G T Q G Q T F W C D H A-
MscI
CviRI
CAv1iuJII
RmaI
MaeI
TspI45
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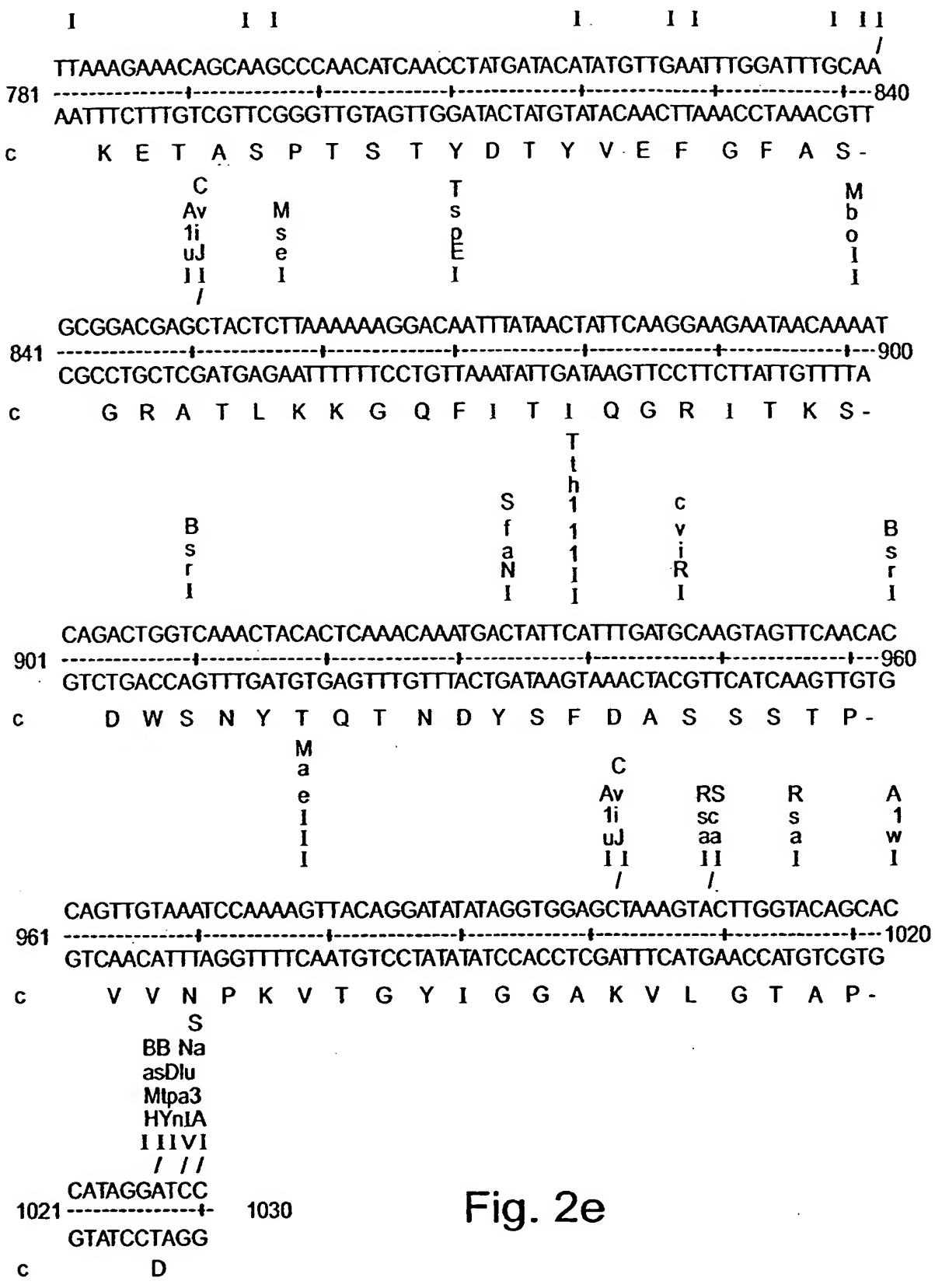
721
780
GACCACGTAATAATCCTTTATCGATACAACTATTGTGATCGTTTCACTGTCGTTTGAAGC
c G A L L G N S Y V D N T S K V T A N F V-
MseI
CCavci8J
NdeI
TFspiE
CviRI
CAacc18
Fig. 2d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840
c K E T A S P T S T Y D T Y V E F G F A S-
CAvI1iuJII
MseI
TspEI
MboII
GCGGACGAGCTACTCTTAAAAAAGGACAATTTATAACTATTCAAGGAAGAATAACAAAAT
841
CGCCTGCTCGATGAGAATTTTTTCCTGTTAAATATTGATAAGTTCCTTCTTATTGTTTTA
900
c G R A T L K K G Q F I T I Q G R I T K S-
BsrI
SfaNI
TthIIII
CviRI
BsrI
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960
c D W S N Y T Q T N D Y S F D A S S S T P-
MaeIII
CAvI1iuJII
RSscaaII
RsaI
A1wI
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961
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1020
c V V N P K V T G Y I G G A K V L G T A P-
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1021
GTATCCTAGG
1030
c D

Fig. 2e

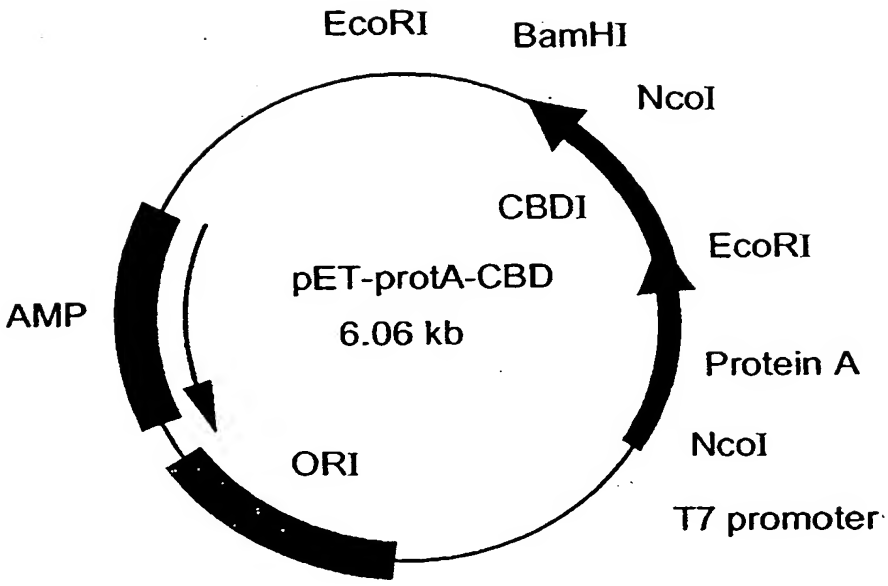


Fig. 3a Map of pET-protA-CBD

Map of protA-CBD

July 15, 1996 17:31

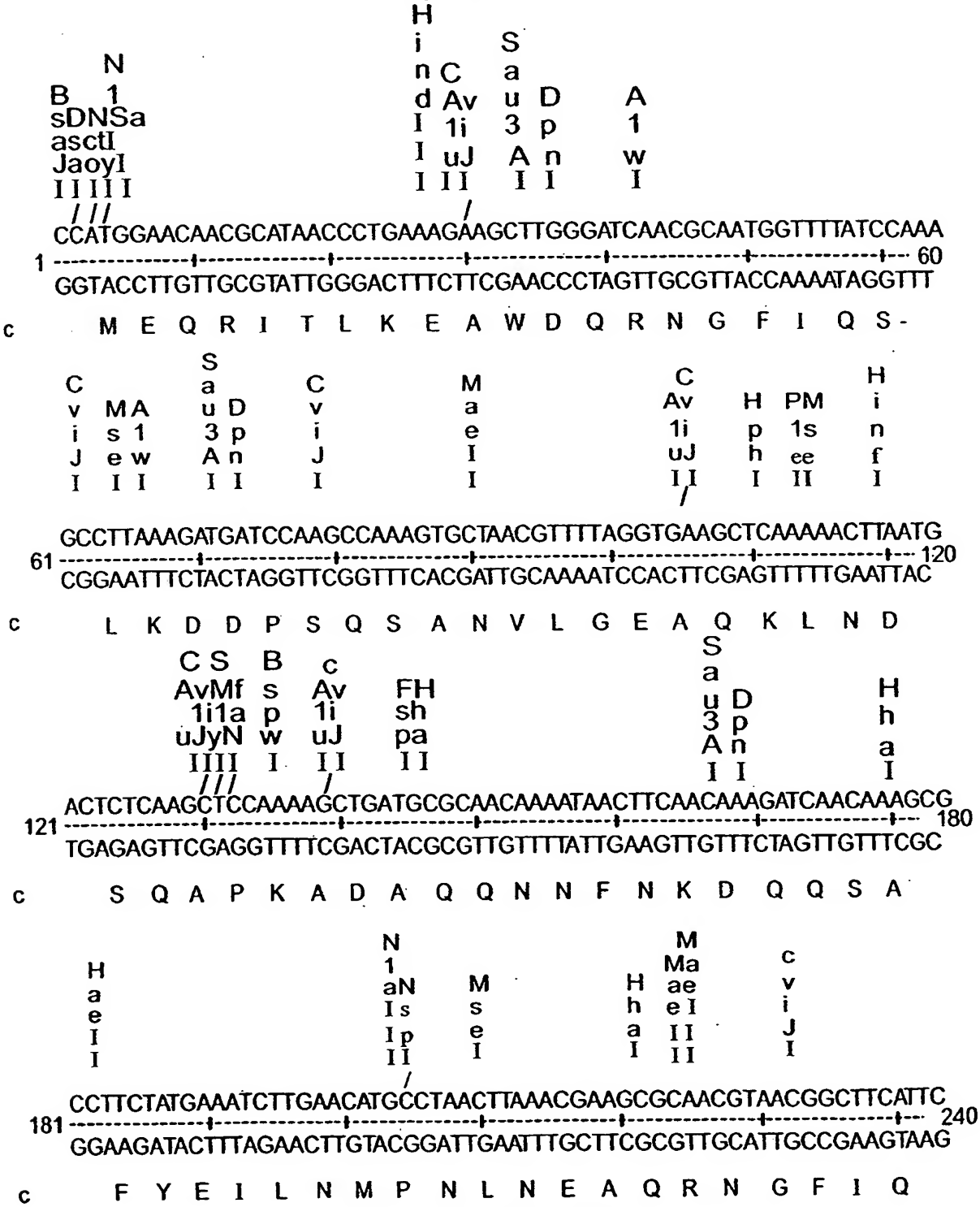
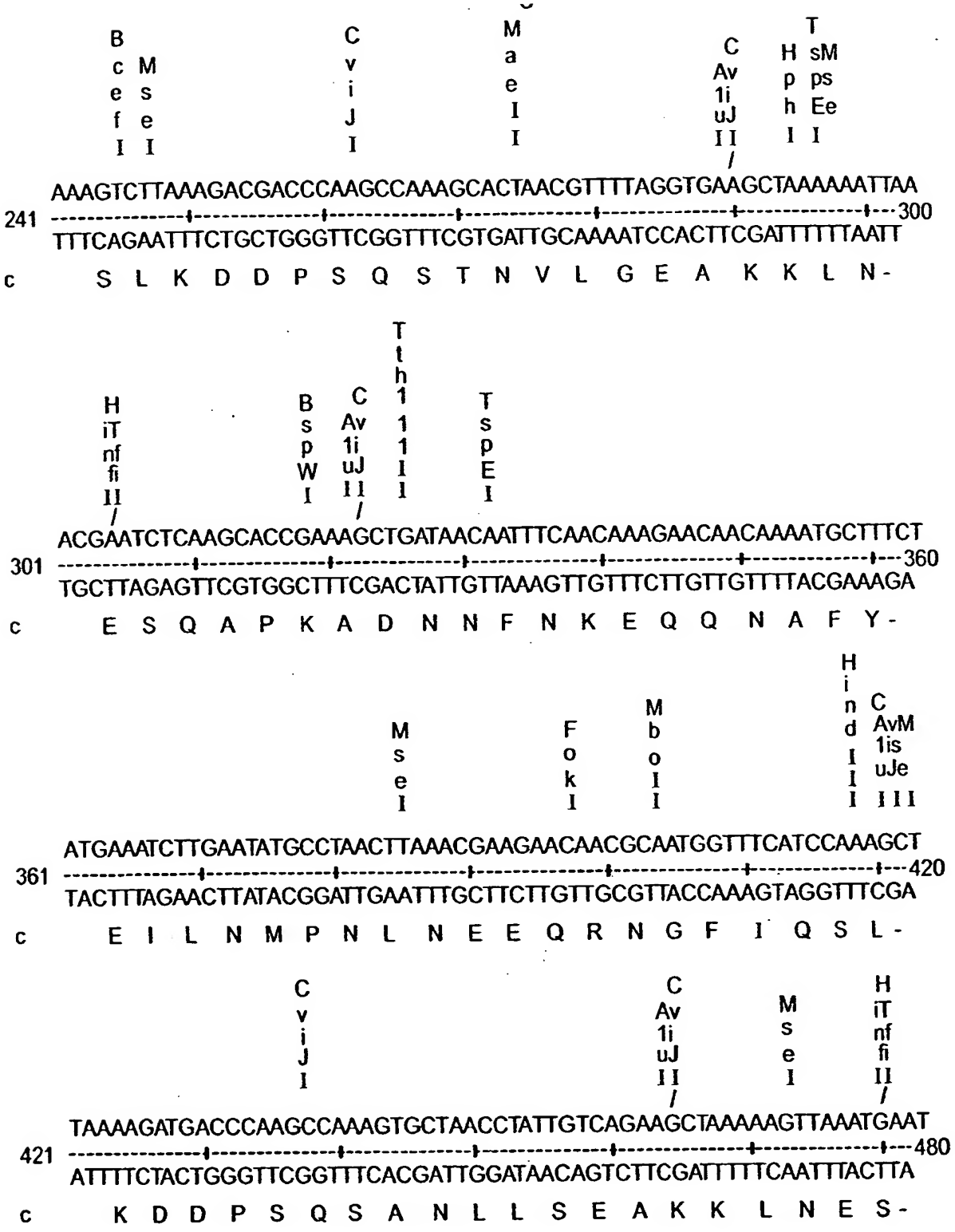


Fig. 3b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CviJI
MaeI
CAv1iuJII HphI TsMpsEeI
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241
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c S L K D D P S Q S T N V L G E A K K L N-
HiTnfiII BspWI CAv1iuJII Tth111I TspEI
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301
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c E S Q A P K A D N N F N K E Q Q N A F Y-
MseI FokI MboII HindIII CAvM1isuJe III
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361
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c E I L N M P N L N E E Q R N G F I Q S L-
CviJI CAv1iuJII MseI HiTnfiII
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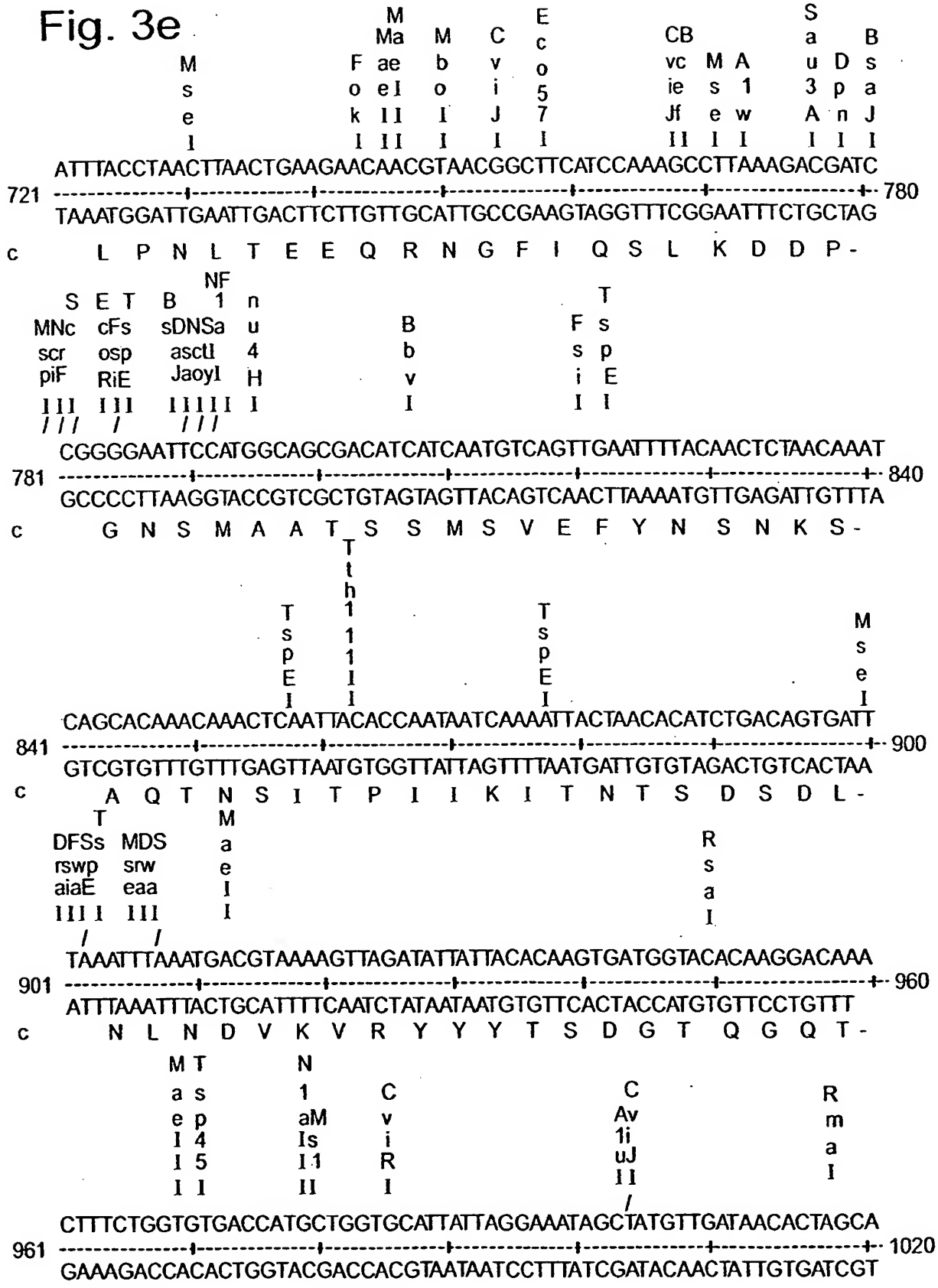
421
ATTTTCTACTGGGTTCGGTTTCACGATTGGATAACAGTCTTCGATTTTTCAATTTACTTA
c K D D P S Q S A N L L S E A K K L N E S-

Fig. 3c

```
        BspWI  Tth111I  FsiI  TspEI
        AciI
     CTCAAGCACCGAAAGCGGATAACAAATTCAACAAAGAACAACAAAATGCTTTCTATGAAA
481  ----+---------+---------+---------+---------+---------+---- 540
     GAGTTCGTGGCTTTCGCCTATTGTTTAAGTTGTTTCTTGTTGTTTTACGAAAGATACTTT

c       Q  A  P  K  A  D  N  K  F  N  K  E  Q  Q  N  A  F  Y  E  I -

        MseI  FokI  MboII  CviJI
     TCTTACATTTACCTAACTTAAACGAAGAACAACGCAATGGTTTCATCCAAAGCCTAAAAG
541  ----+---------+---------+---------+---------+---------+---- 600
     AGAATGTAAATGGATTGAATTTGCTTCTTGTTGCGTTACCAAAGTAGGTTTCGGATTTTC

c       L  H  L  P  N  L  N  E  E  Q  R  N  G  F  I  Q  S  L  K  D -

        CviJI  Eco47III  HhaI  HaeII  AluI/CviJI  SfaNI  AluI/CviJI
     ATGACCCAAGCCAAAGCGCTAACCTTTTAGCAGAAGCTAAAAAGCTAAATGATGCTCAAG
601  ----+---------+---------+---------+---------+---------+---- 660
     TACTGGGTTCGGTTTCGCGATTGGAAAATCGTCTTCGATTTTTCGATTTACTACGAGTTC

c       D  P  S  Q  S  A  N  L  L  A  E  A  K  K  L  N  D  A  Q  A -

        BspWI  AluI/CviJI  Tth111I  FsiI  TspEI  FsiI  TspEI
     CACCAAAAGCTGACAACAAATTCAACAAAGAACAACAAAATGCTTTCTATGAAATTTTAC
661  ----+---------+---------+---------+---------+---------+---- 720
     GTGGTTTTCGACTGTTGTTTAAGTTGTTTCTTGTTGTTTTACGAAAGATACTTTAAAATG

c       P  K  A  D  N  K  F  N  K  E  Q  Q  N  A  F  Y  E  I  L  H -
```

Fig. 3d

Fig. 3e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c L P N L T E E Q R N G F I Q S L K D D P-
CGGGGAATTCCATGGCAGCGACATCATCAATGTCAGTTGAATTTTACAACTCTAACAAAT
781 840
GCCCCTTAAGGTACCGTCGCTGTAGTAGTTACAGTCAACTTAAAATGTTGAGATTGTTTA
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841 900
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c A Q T N S I T P I I K I T N T S D S D L-
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901 960
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c N L N D V K V R Y Y Y T S D G T Q G Q T-
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961 1020
GAAAGACCACACTGGTACGACCACGTAATAATCCTTTATCGATACAACTATTGTGATCGT

```
   F  W  C  D  H  A  G  A  L  L  G  N  S  Y  V  D  N  T  S  K-
MaeIII Tsp45I          MseI          Cac8I CviJI               NdeI
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1021 ---------------------------------------------------- 1080
TTCACTGTCGTTTGAAGCAATTTCTTTGTCGTTCGGGTTGTAGTTGGATACTATGTATAC
c  V  T  A  N  F  V  K  E  T  A  S  P  T  S  T  Y  D  T  Y  V-

FsiI TspEI      CviRI AciI Cac8I    AluI CviJI    MseI      TspEI
TTGAATTTGGATTTGCAAGCGGACGAGCTACTCTTAAAAAAGGACAATTTATAACTATTC
1081 ---------------------------------------------------- 1140
AACTTAAACCTAAACGTTCGCCTGCTCGATGAGAATTTTTTCCTGTTAAATATTGATAAG
c  E  F  G  F  A  S  G  R  A  T  L  K  K  G  Q  F  I  T  I  Q-

              MboII        BsrI                    sfaNI Tth111II
AAGGAAGAATAACAAAATCAGACTGGTCAAACTACACTCAAACAAATGACTATTCATTTG
1141 ---------------------------------------------------- 1200
TTCCTTCTTATTGTTTTAGTCTGACCAGTTTGATGTGAGTTTGTTTACTGATAAGTAAAC
c  G  R  I  T  K  S  D  W  S  N  Y  T  Q  T  N  D  Y  S  F  D-

CviRI          BsrI          MaeIII                  AluI CviJI
ATGCAAGTAGTTCAACACCAGTTGTAAATCCAAAAGTTACAGGATATATAGGTGGAGCTA
1201 ---------------------------------------------------- 1260
TACGTTCATCAAGTTGTGGTCAACATTTAGGTTTTCAATGTCCTATATATCCACCTCGAT
c  A  S  S  S  T  P  V  V  N  P  K  V  T  G  Y  I  G  G  A  K-

RsaI ScaI   RsaI   AlwI   BamHI BstYI DpnI Sau3AI NlaIV
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```

Fig. 3f

1261----------I----------I---------- 1288
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c V L G T A P * D-

Fig. 3g

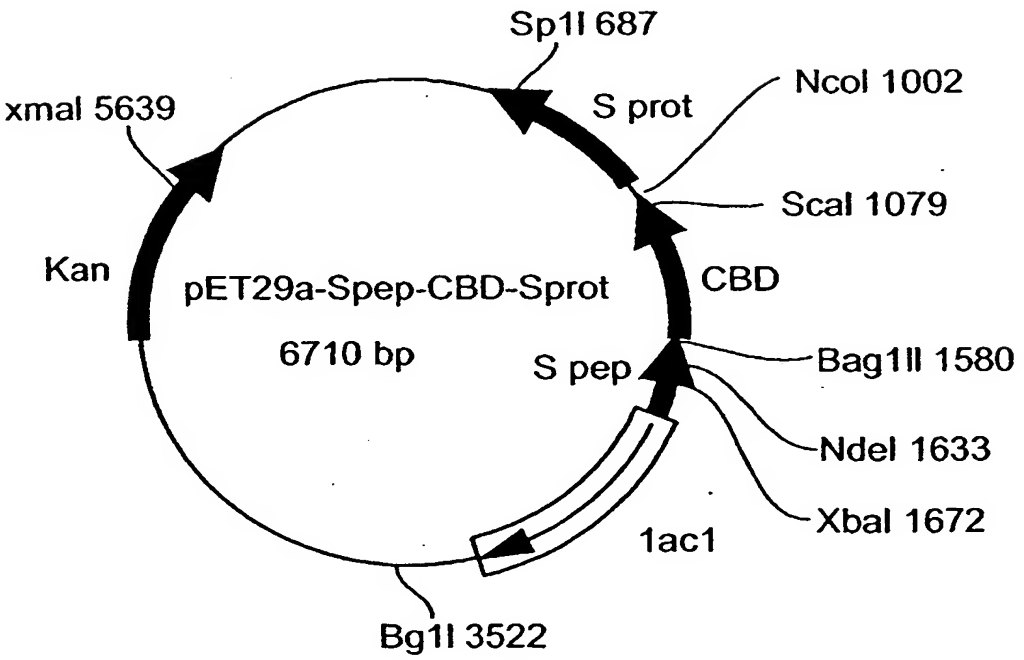
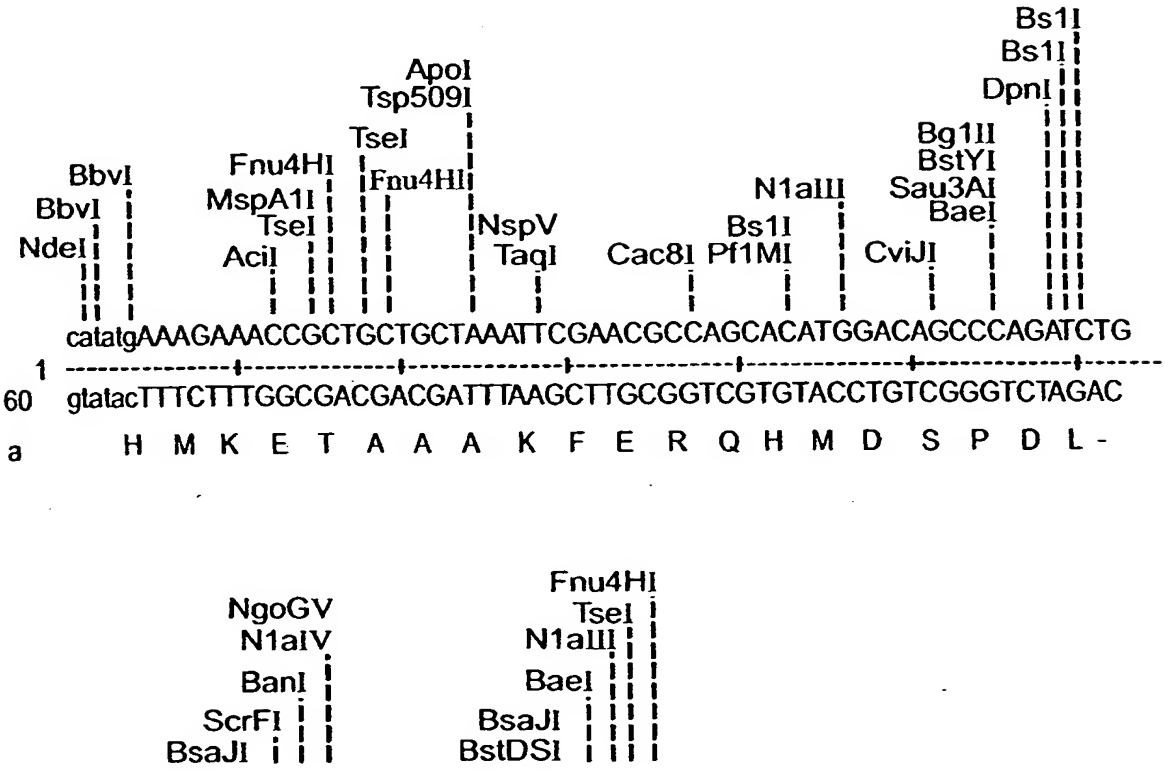


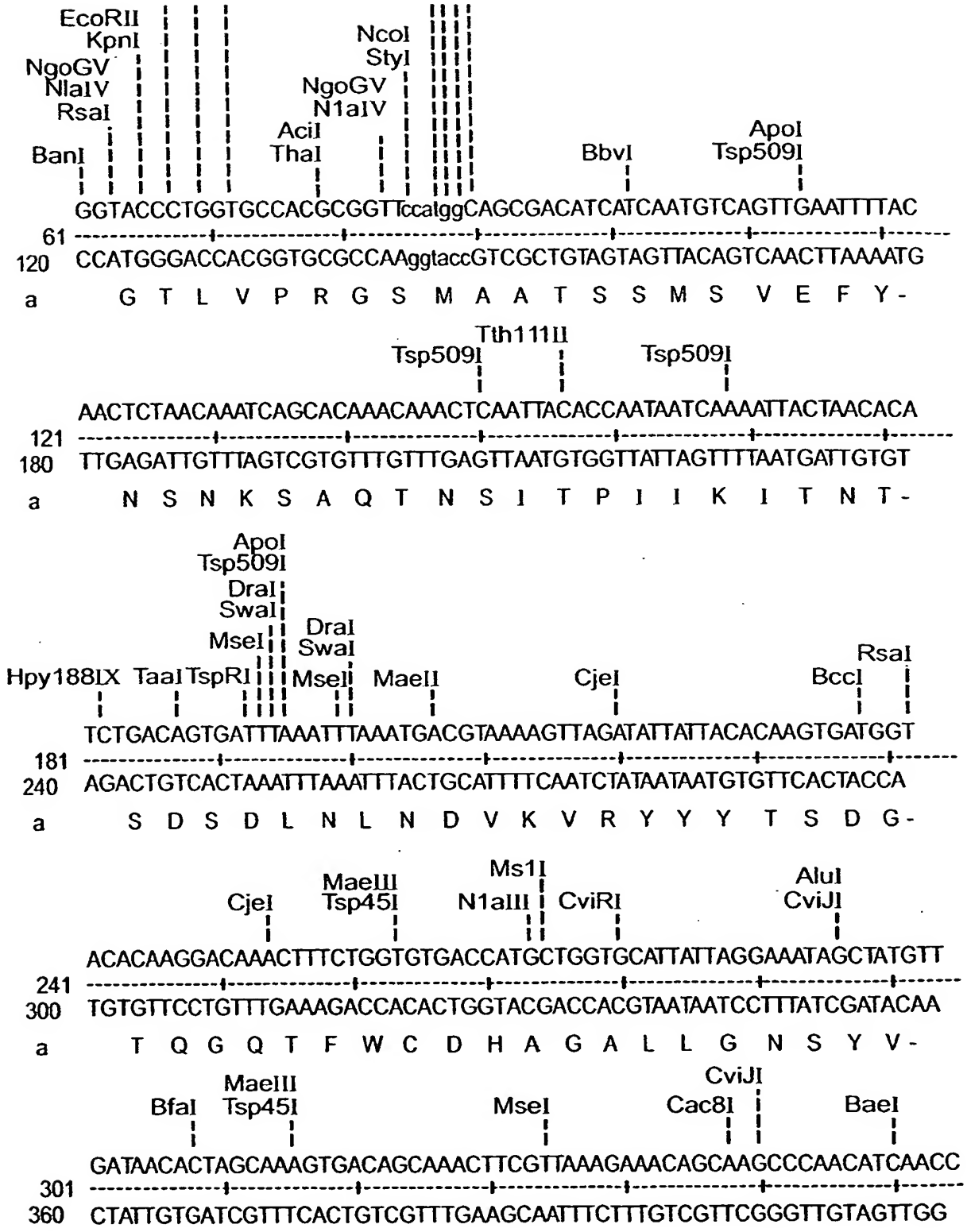
Fig. 4a Map of pET29-Spep-CBD-Sprot

Fig. 4b

Map of: S peptide-CBD-S protein

November 10, 1999 14:34

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BanI
AciI
ThaI
NcoI
StyI
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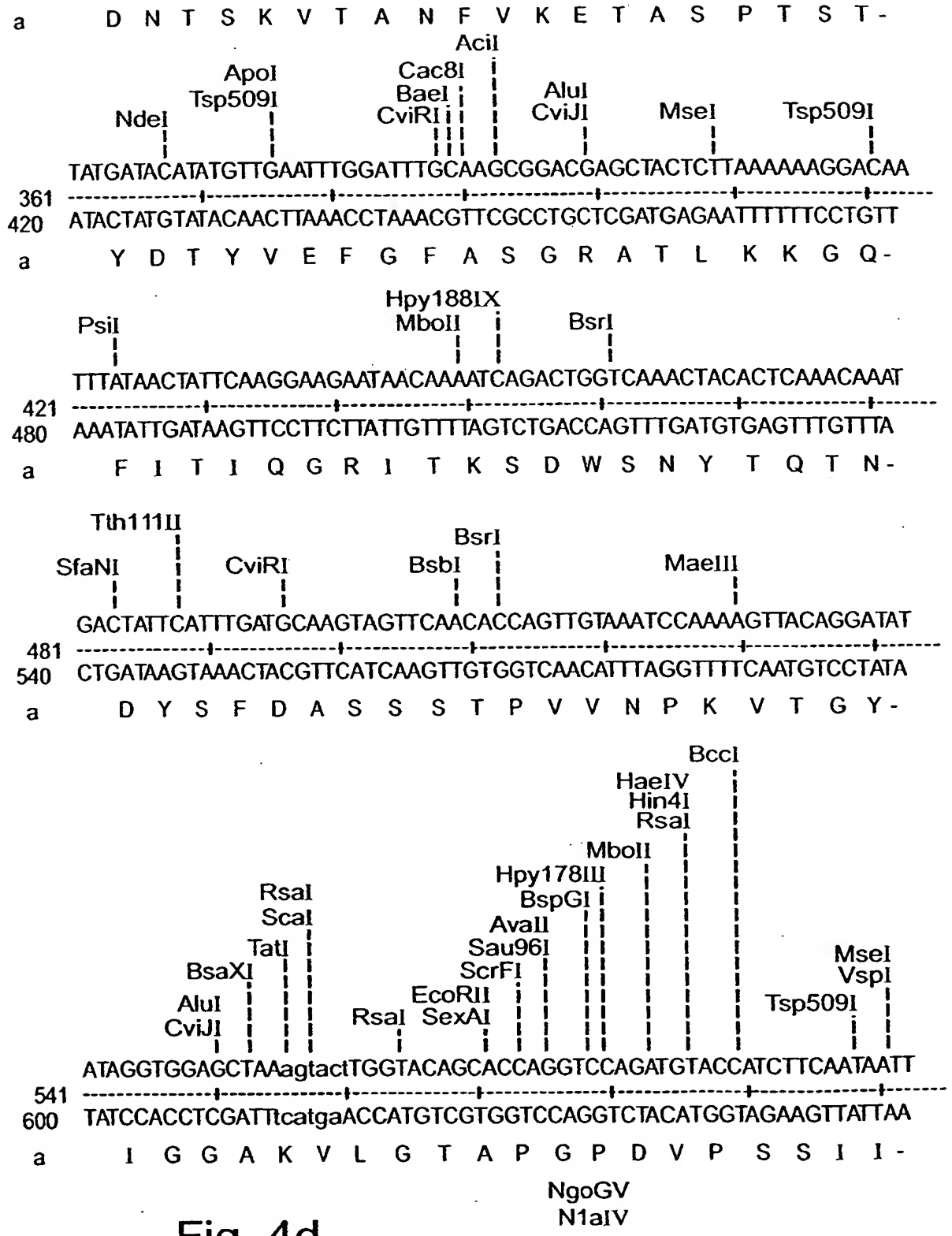
BbvI
ApoI
Tsp509I
GGTACCCTGGTGCCACGCGGTTccatggCAGCGACATCATCAATGTCAGTTGAATTTTAC
61
120 CCATGGGACCACGGTGCGCCAAggtaccGTCGCTGTAGTAGTTACAGTCAACTTAAAATG
a G T L V P R G S M A A T S S M S V E F Y-
Tsp509I
Tth111II
Tsp509I
AACTCTAACAAATCAGCACAAACAAACTCAATTACACCAATAATCAAAATTACTAACACA
121
180 TTGAGATTGTTTAGTCGTGTTTGTTTGAGTTAATGTGGTTATTAGTTTTAATGATTGTGT
a N S N K S A Q T N S I T P I I K I T N T-
ApoI
Tsp509I
DraI
SwaI
MseI
DraI
SwaI
Hpy188IX
TaaI
TspRI
MseII
MaeII
CjeI
BccI
RsaI
TCTGACAGTGATTTAAATTTAAATGACGTAAAAGTTAGATATTATTACACAAGTGATGGT
181
240 AGACTGTCACTAAATTTAAATTTACTGCATTTTCAATCTATAATAATGTGTTCACTACCA
a S D S D L N L N D V K V R Y Y Y T S D G-
CjeI
MaeIII
Tsp45I
Ms1I
N1aIII
CviRI
AluI
CviJI
ACACAAGGACAAACTTTCTGGTGTGACCATGCTGGTGCATTATTAGGAAATAGCTATGTT
241
300 TGTGTTCCTGTTTGAAAGACCACACTGGTACGACCACGTAATAATCCTTTATCGATACAA
a T Q G Q T F W C D H A G A L L G N S Y V-
BfaI
MaeIII
Tsp45I
MseI
CviJI
Cac8I
BaeI
GATAACACTAGCAAAGTGACAGCAAACTTCGTTAAAGAAACAGCAAGCCCAACATCAACC
301
360 CTATTGTGATCGTTTCACTGTCGTTTGAAGCAATTTCTTTGTCGTTCGGGTTGTAGTTGG

Fig. 4c


a D N T S K V T A N F V K E T A S P T S T-
AciI
ApoI
Tsp509I
Cac8I
BaeI
CviRI
AluI
CviJI
NdeI
MseI
Tsp509I
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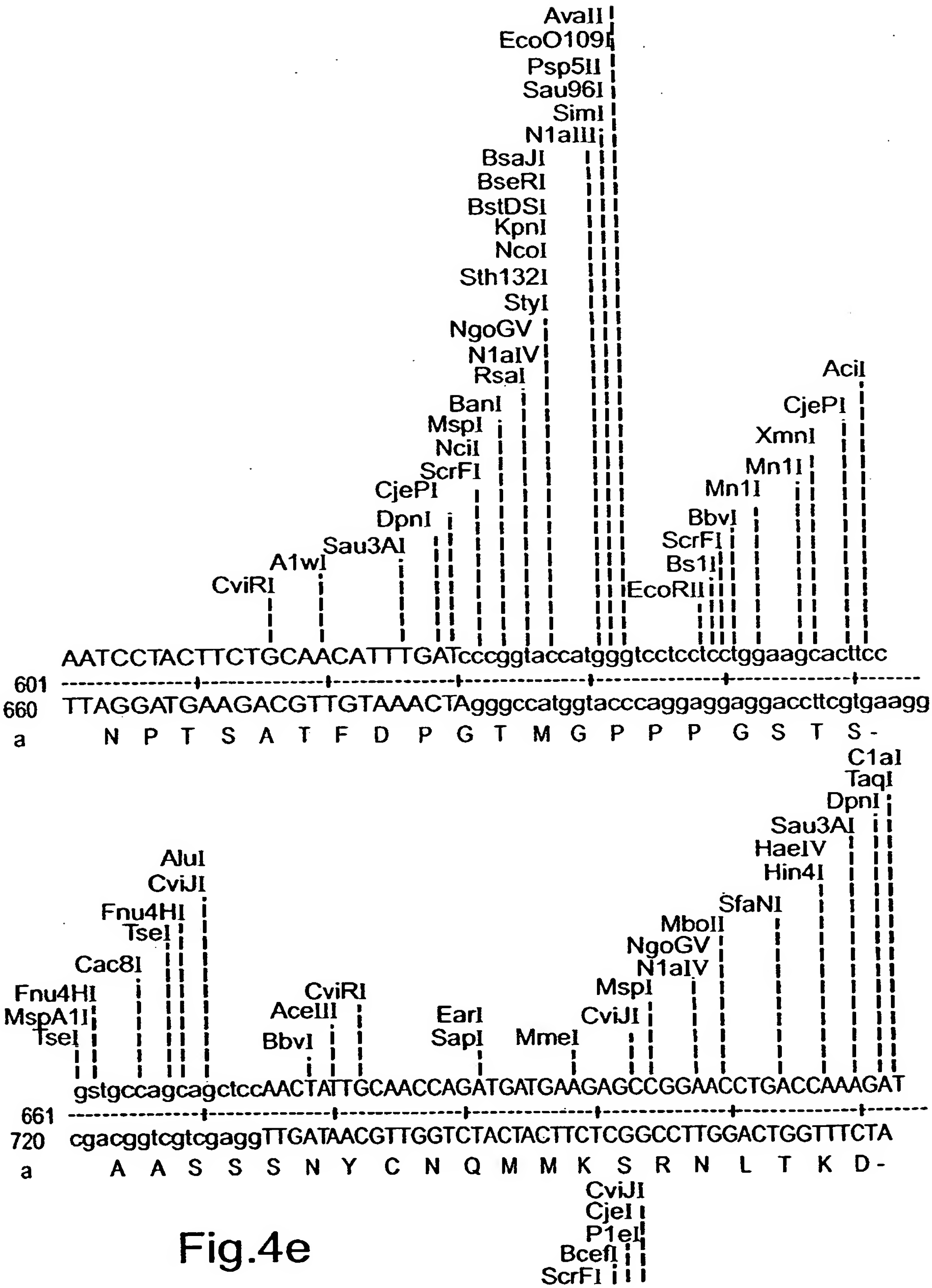
361
420 ATACTATGTATACAACTTAAACCTAAACGTTCGCCTGCTCGATGAGAATTTTTTCCTGTT
a Y D T Y V E F G F A S G R A T L K K G Q-
Hpy188IX
MboII
PsiI
BsrI
TTTATAACTATTCAAGGAAGAATAACAAAATCAGACTGGTCAAACTACACTCAAACAAAT
421
480 AAATATTGATAAGTTCCTTCTTATTGTTTTAGTCTGACCAGTTTGATGTGAGTTTGTTTA
a F I T I Q G R I T K S D W S N Y T Q T N-
Tth111II
BsrI
SfaNI
CviRI
BsbI
MaeIII
GACTATTCATTTGATGCAAGTAGTTCAACACCAGTTGTAAATCCAAAAGTTACAGGATAT
481
540 CTGATAAGTAAACTACGTTCATCAAGTTGTGGTCAACATTTAGGTTTTCAATGTCCTATA
a D Y S F D A S S S T P V V N P K V T G Y-
BccI
HaeIV
Hin4I
RsaI
MboII
Hpy178III
BspGI
RsaI
ScaI
AvaII
TatI
Sau96I
BsaXI
ScrFI
MseI
VspI
EcoRII
AluI
RsaI
SexAI
Tsp509I
CviJI
ATAGGTGGAGCTAAagtactTGGTACAGCACCAGGTCCAGATGTACCATCTTCAATAATT
541
600 TATCCACCTCGATTtcatgaACCATGTCGTGGTCCAGGTCTACATGGTAGAAGTTATTAA
a I G G A K V L G T A P G P D V P S S I I-
NgoGV
N1aIV

Fig. 4d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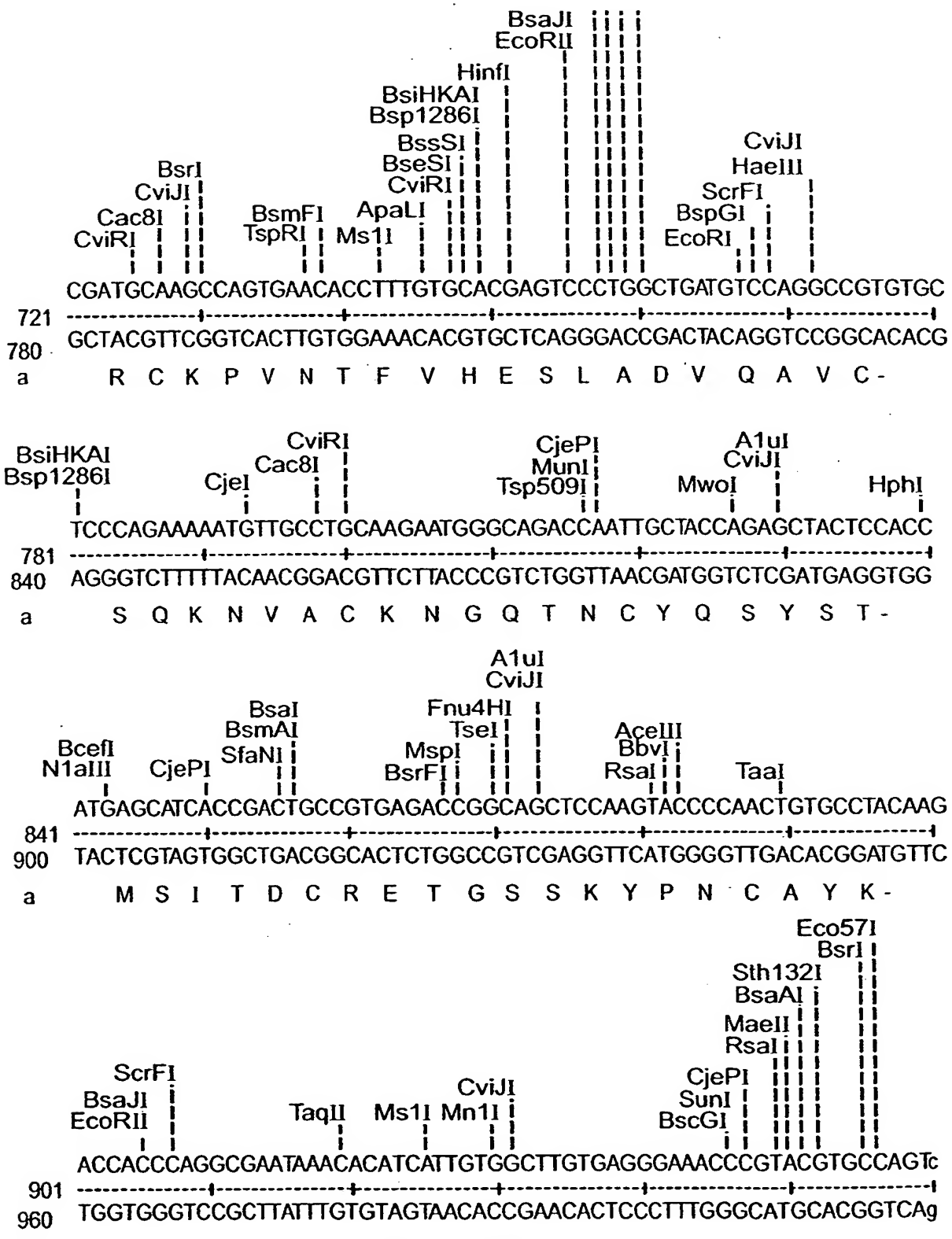
EcoO109I
Psp5II
Sau96I
SimI
N1aIII
BsaJI
BseRI
BstDSI
KpnI
NcoI
Sth132I
StyI
NgoGV
N1aIV
RsaI
BanI
MspI
NciI
ScrFI
CjePI
DpnI
Sau3AI
A1wI
CviRI
EcoRII
Bs1I
ScrFI
BbvI
Mn1I
Mn1I
XmnI
CjePI
AciI
AATCCTACTTCTGCAACATTTGATcccggtaccatgggtcctcctcctggaagcacttcc
601
660
TTAGGATGAAGACGTTGTAAACTAgggccatggtacccaggaggaggaccttcgtgaagg
a
N P T S A T F D P G T M G P P P G S T S -
C1aI
TaqI
DpnI
Sau3AI
HaeIV
Hin4I
SfaNI
MboII
NgoGV
N1aIV
MspI
CviJI
MmeI
EarI
SapI
CviRI
AceIII
BbvI
AluI
CviJI
Fnu4HI
TseI
Cac8I
Fnu4HI
MspA1I
TseI
gstgccagcagctccAACTATTGCAACCAGATGATGAAGAGCCGGAACCTGACCAAAGAT
661
720
cgacggtcgtcgaggTTGATAACGTTGGTCTACTACTTCTCGGCCTTGGACTGGTTTCTA
a
A A S S S N Y C N Q M M K S R N L T K D -
CviJI
CjeI
P1eI
BcefI
ScrFI

Fig.4e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HinfI
BsiHKAI
Bsp1286I
BssSI
BseSI
CviRI
ApaLI
Ms1I
BsmFI
TspRI
BsrI
CviJI
Cac8I
CviRI
CviJI
HaeIII
ScrFI
BspGI
EcoRI
CGATGCAAGCCAGTGAACACCTTTGTGCACGAGTCCCTGGCTGATGTCCAGGCCGTGTGC
721
780
GCTACGTTCGGTCACTTGTGGAAACACGTGCTCAGGGACCGACTACAGGTCCGGCACACG
a R C K P V N T F V H E S L A D V Q A V C-
BsiHKAI
Bsp1286I
CviRI
Cac8I
CjeI
CjePI
MunI
Tsp509I
A1uI
CviJI
MwoI
HphI
TCCCAGAAAAATGTTGCCTGCAAGAATGGGCAGACCAATTGCTACCAGAGCTACTCCACC
781
840
AGGGTCTTTTTACAACGGACGTTCTTACCCGTCTGGTTAACGATGGTCTCGATGAGGTGG
a S Q K N V A C K N G Q T N C Y Q S Y S T-
A1uI
CviJI
BsaI
BsmAI
SfaNI
Fnu4HI
TseI
MspI
BsrFI
AceIII
BbvI
RsaI
BcefI
N1aIII
CjePI
TaaI
ATGAGCATCACCGACTGCCGTGAGACCGGCAGCTCCAAGTACCCCAACTGTGCCTACAAG
841
900
TACTCGTAGTGGCTGACGGCACTCTGGCCGTCGAGGTTCATGGGGTTGACACGGATGTTC
a M S I T D C R E T G S S K Y P N C A Y K-
Eco57I
BsrI
Sth132I
BsaAI
MaeII
RsaI
ScrFI
BsaJI
EcoRII
TaqII
Ms1I
CviJI
Mn1I
CjePI
SunI
BscGI
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901
960
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a

Fig. 4f

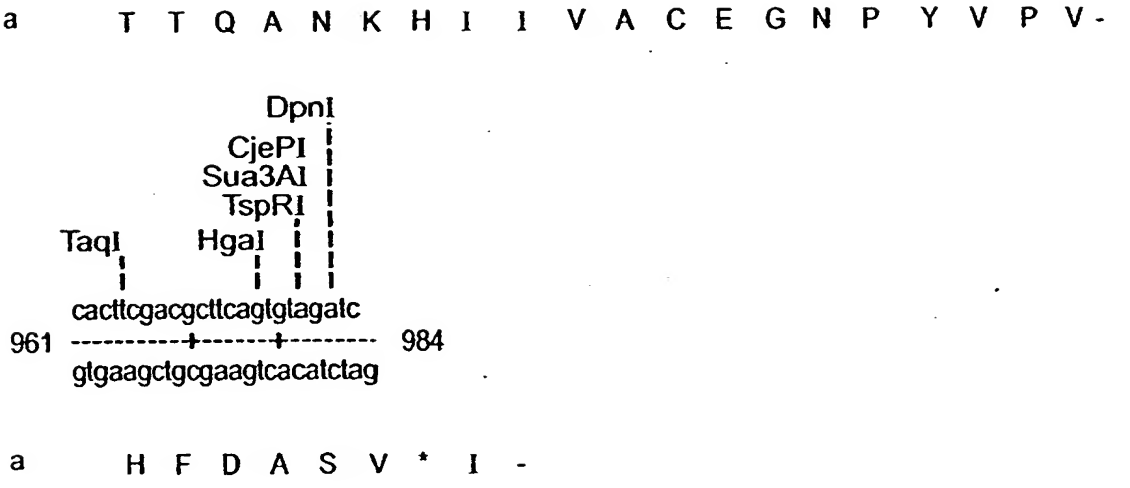

a T T Q A N K H I I V A C E G N P Y V P V-
DpnI
CjePI
Sua3AI
TspRI
TaqI
HgaI
cacttcgacgcttcagtgtagatc
961
984
gtgaagctgcgaagtcacatctag
a H F D A S V * I -

Fig. 4g

KEY:
CBD = Cellulose binding domain
CCP = Cellulose cross - linking protein
PSU = Polysaccharide structural unit

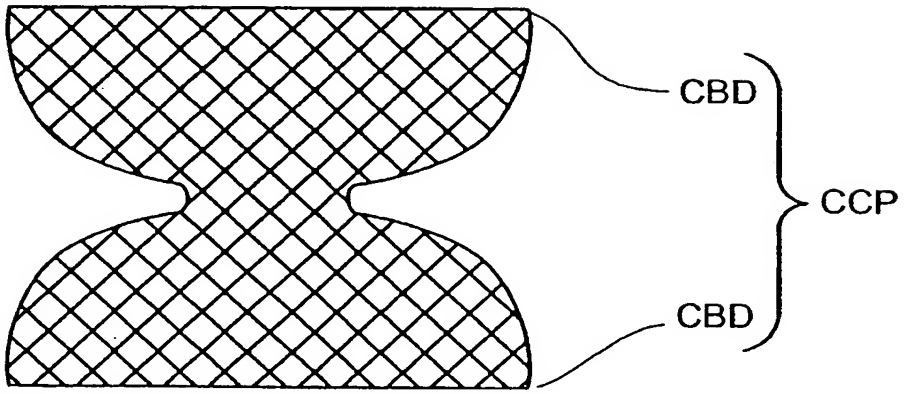


Fig. 5a

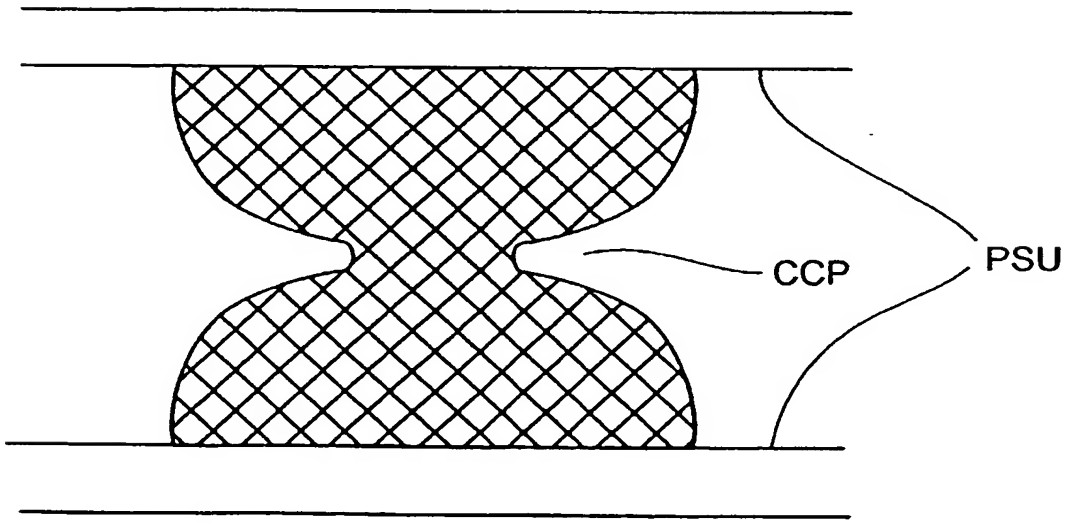


Fig. 5b

KEY:
CBD = Cellulose binding domain
LU = Linker unit
CU = CBD coupler unit

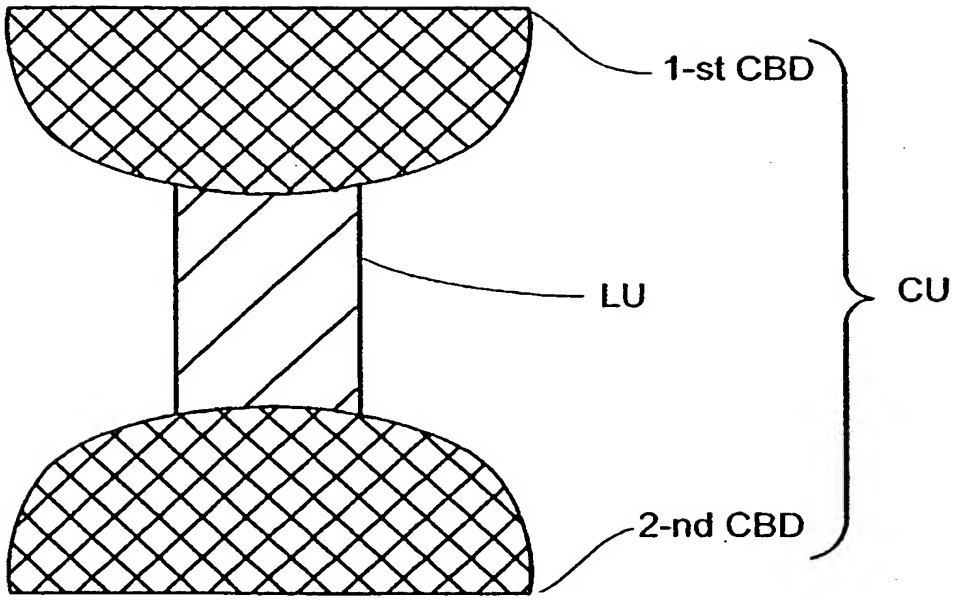


Fig. 6

Fig. 7a

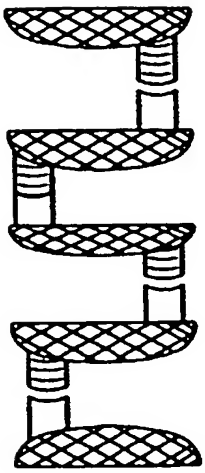


Fig. 7b

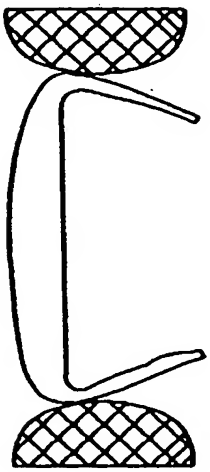


Fig. 7c

KEY:

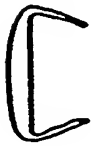
= CBD

= STARCH BINDING DOMAIN

= STARCH

= JUN

= FOS



= LARGE PROTEIN MOIETY

KEY:
CBDF = CBD functional moiety
CBD = Cellulose binding domain
CU = Functional moiety

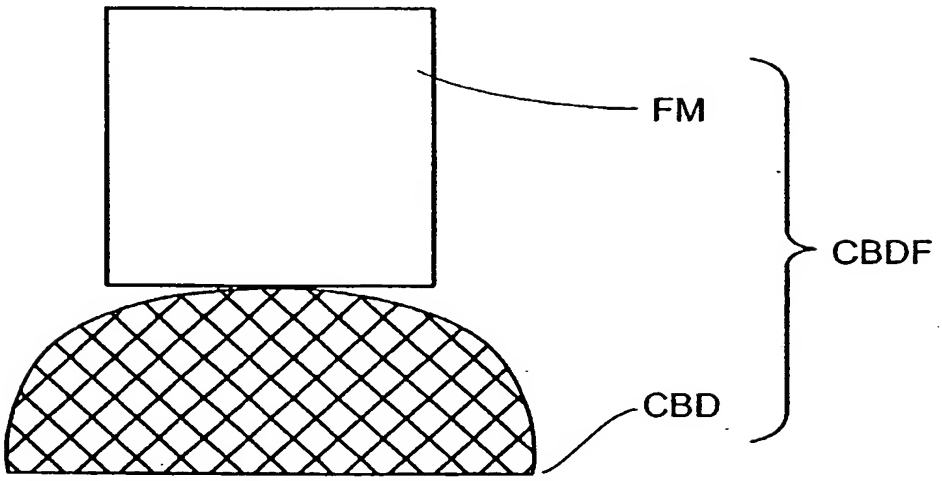


Fig. 8

KEY:
PSU = Polysaccharide unit
CBD = Cellulose binding domain
LU = Linker unit

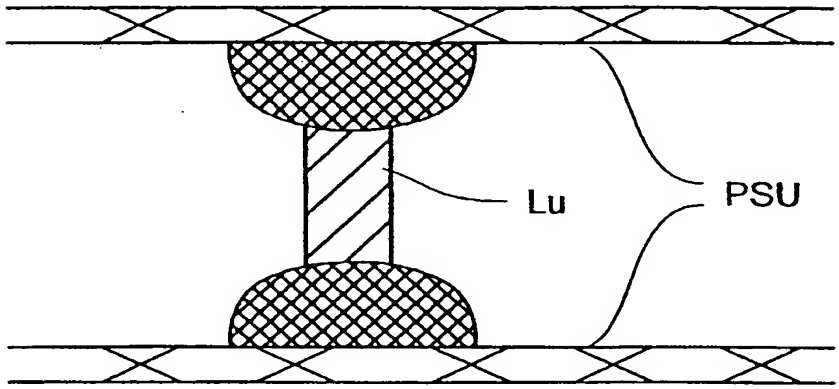


Fig. 9a

KEY:
PSU = Polysaccharide unit
CBD = Cellulose binding domain
LU = Linker unit

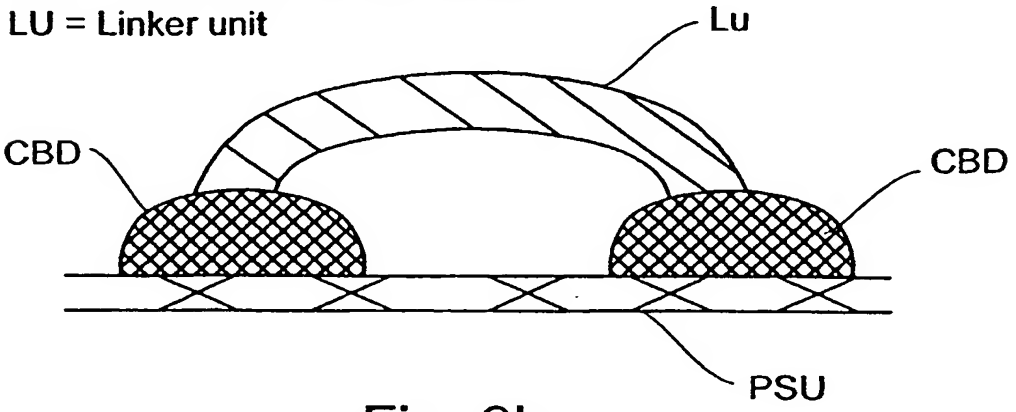


Fig. 9b

KEY:
PSU = Polysaccharide unit
CBD = Cellulose binding domain
LU = Linker unit

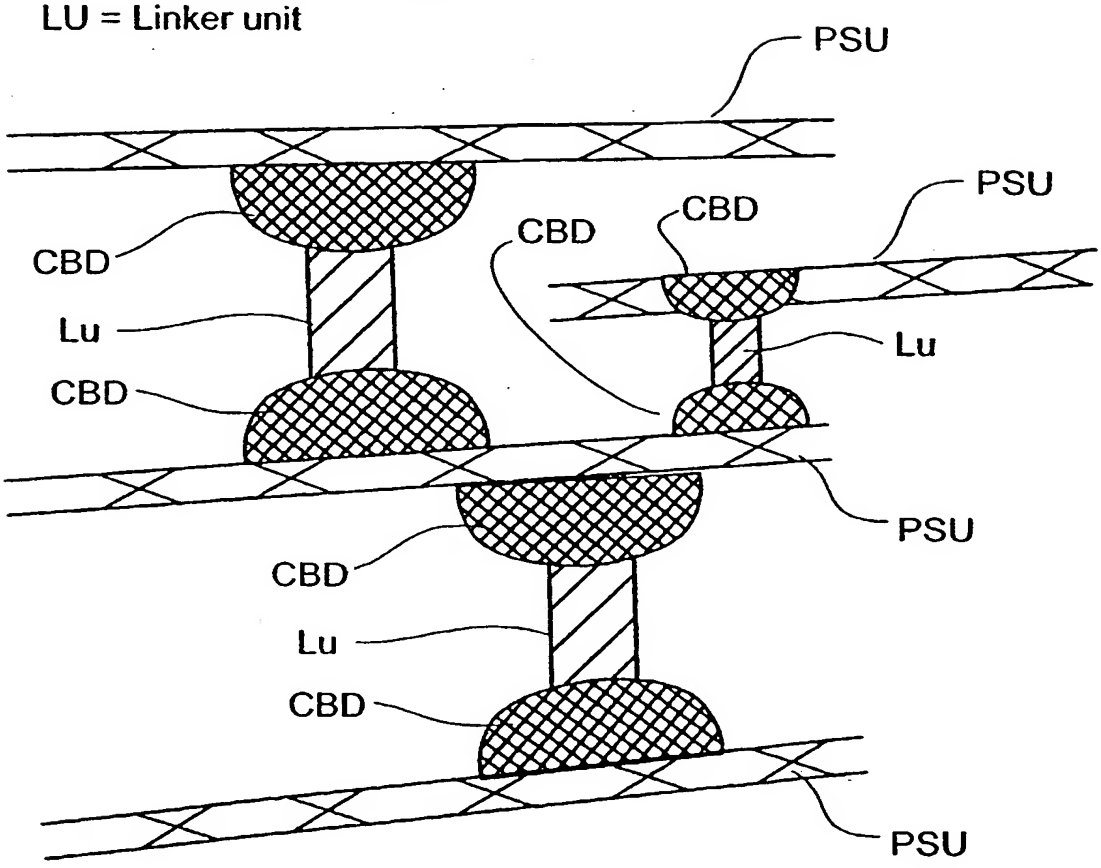


Fig. 9c

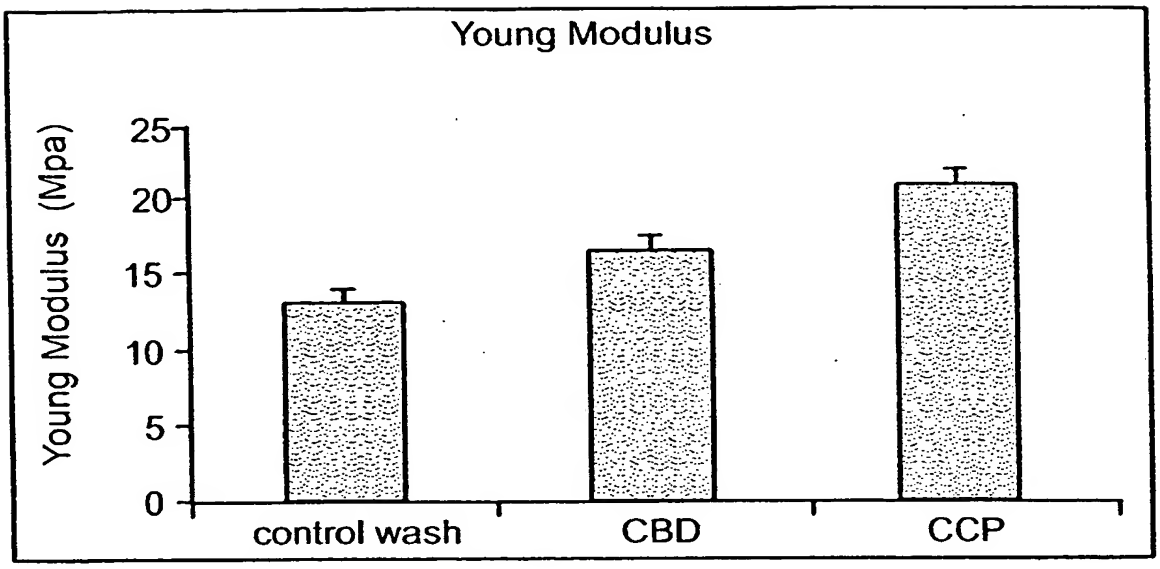


Fig. 10a Young Modulus of CBD and CCP treated papers

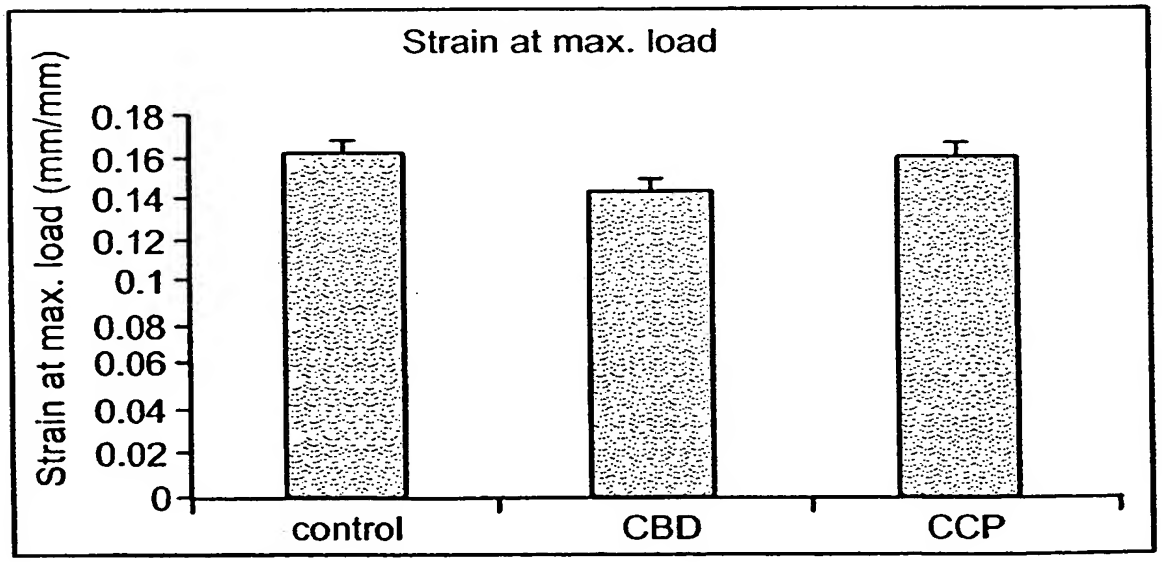


Fig. 10b Strain at maxium load of CBD and CCP treated papers

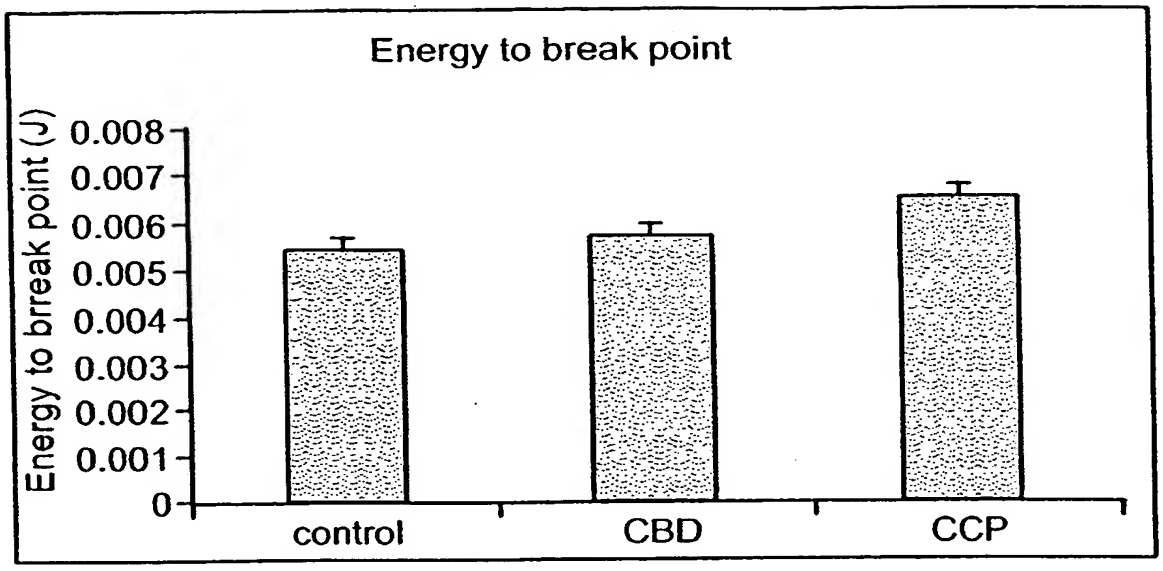


Fig. 10c Energy to break points of CBD and CCP treated papers

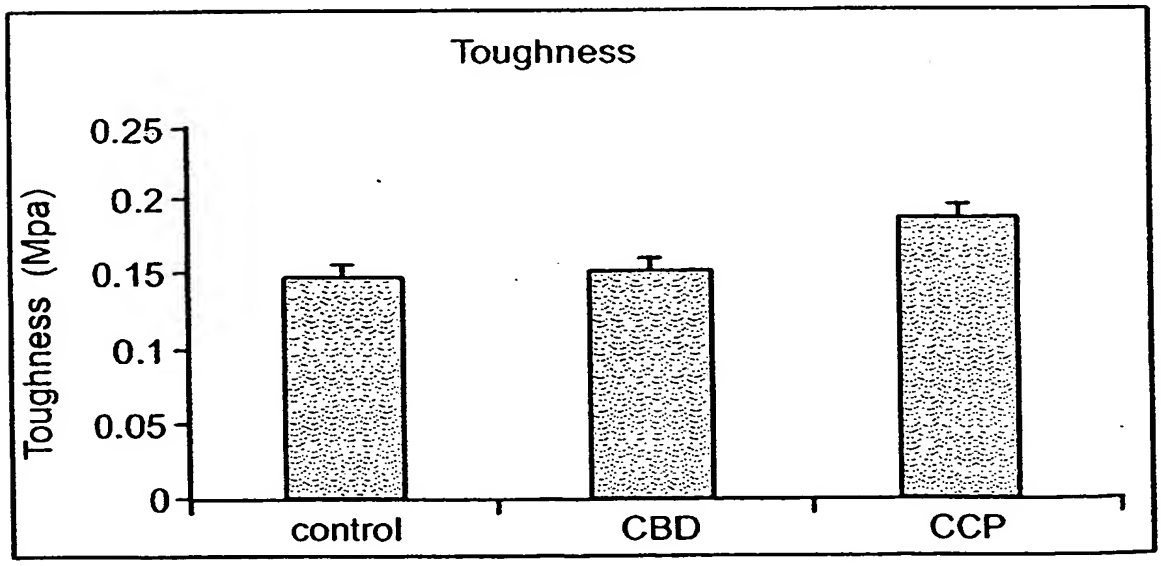


Fig. 10d Toughness of CBD and CCP treated papers

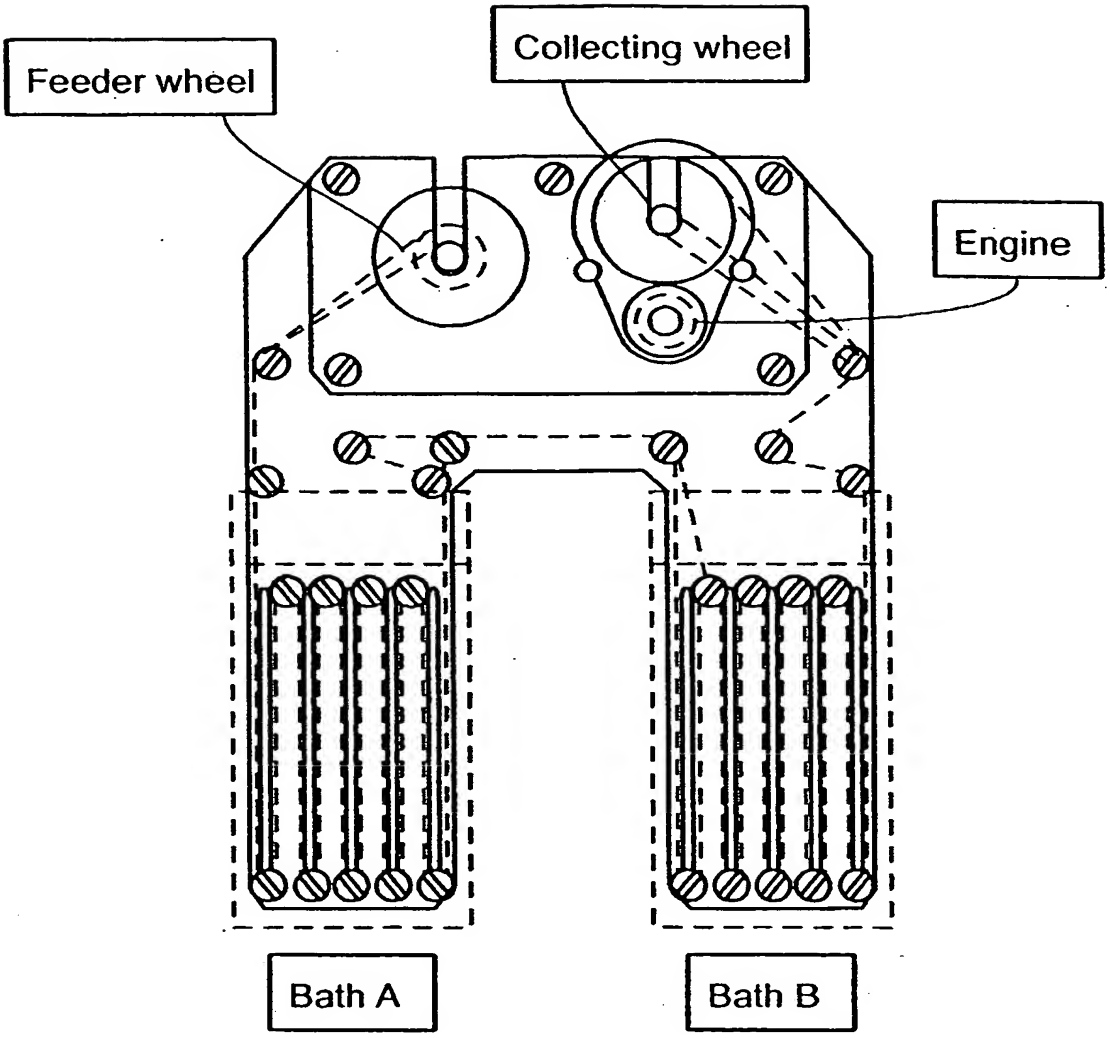


Fig. 11 Yarn treatments

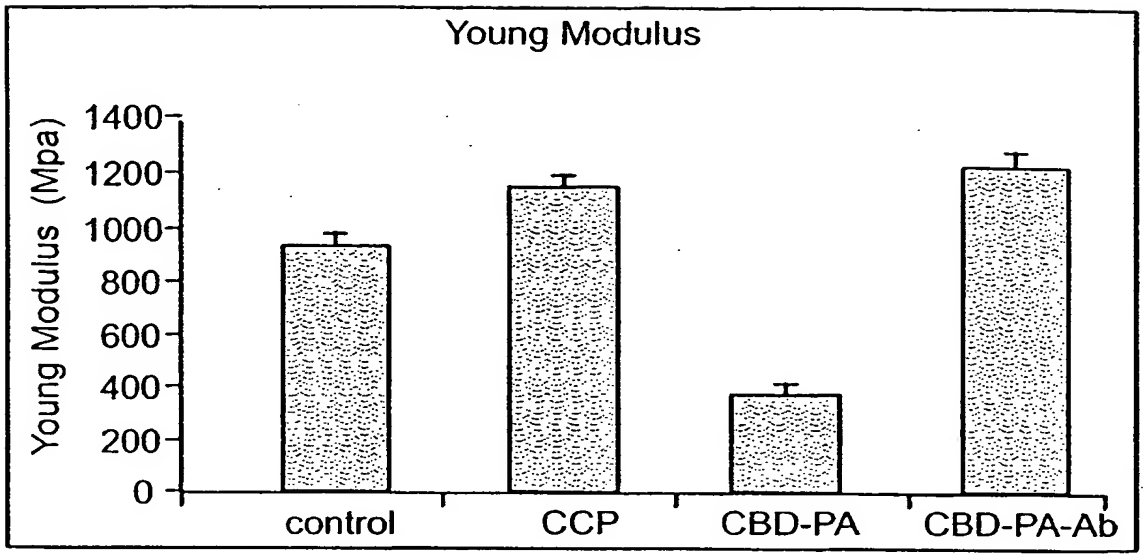


Fig. 12a Young modulus of CCP, CBD-PA and CBD-PA-Ab treated cotton yarn

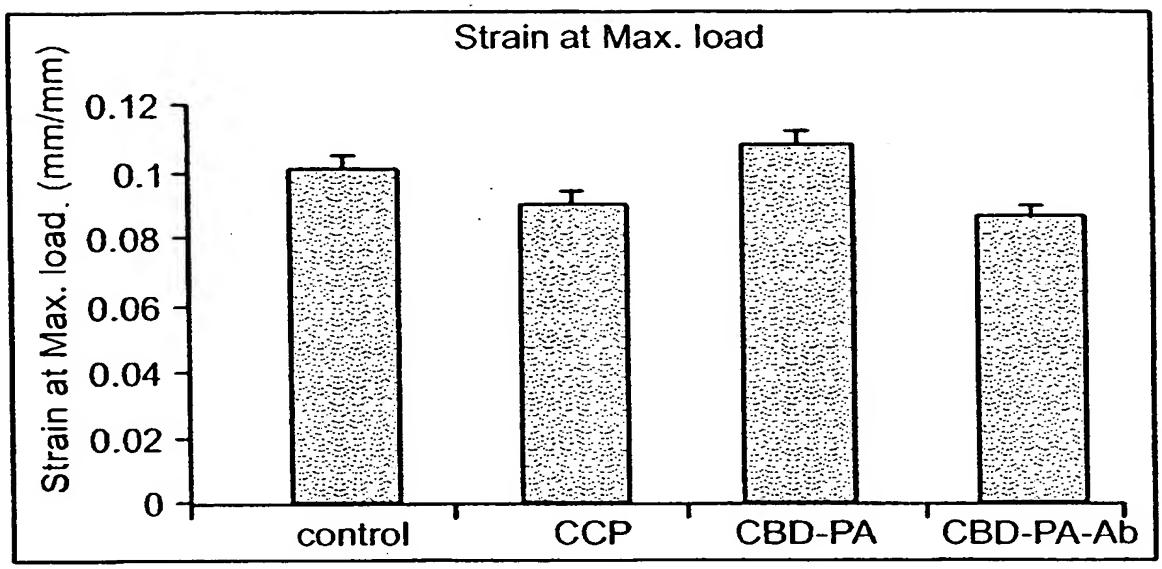


Fig. 12b Strain at maximum load of CCP, CBD-PA and CBD-PA-Ab treated cotton yarn

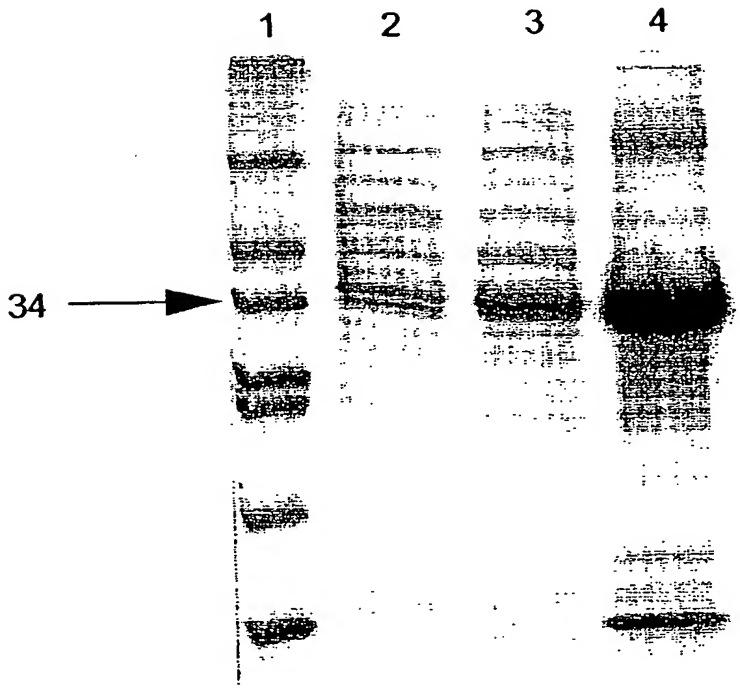


Fig. 13

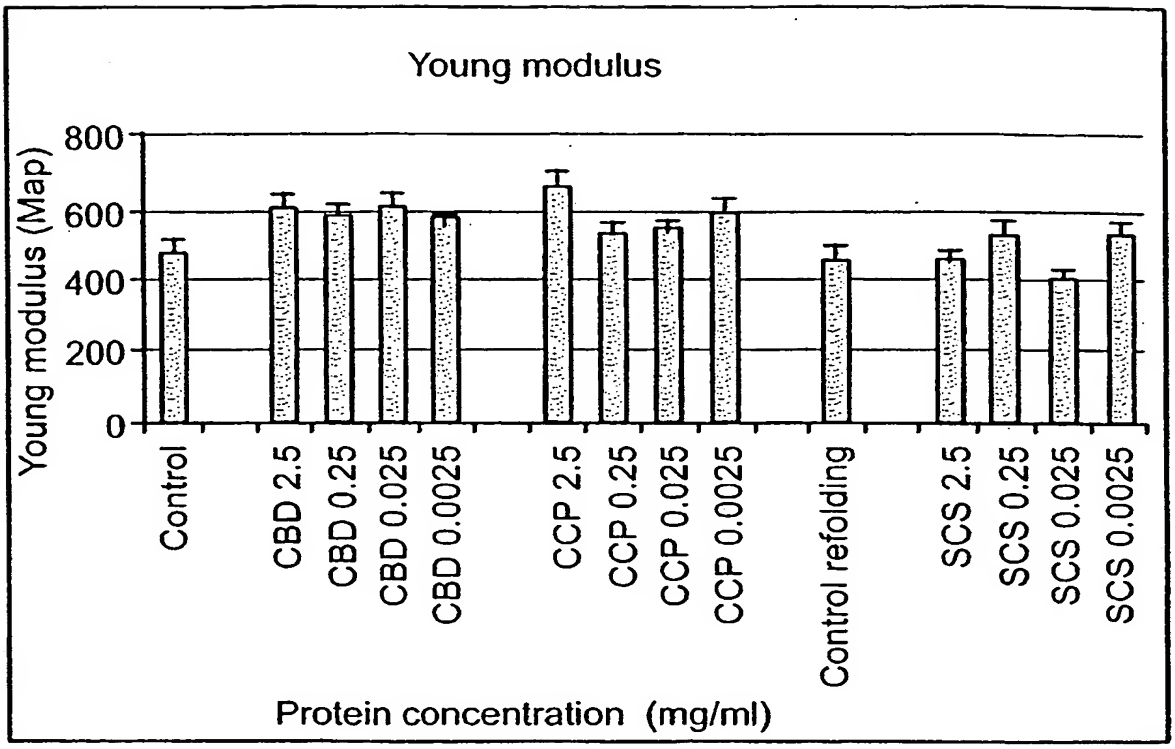


Fig. 14 Young modulus of CBD CCP and SCS treated Whatman papers.

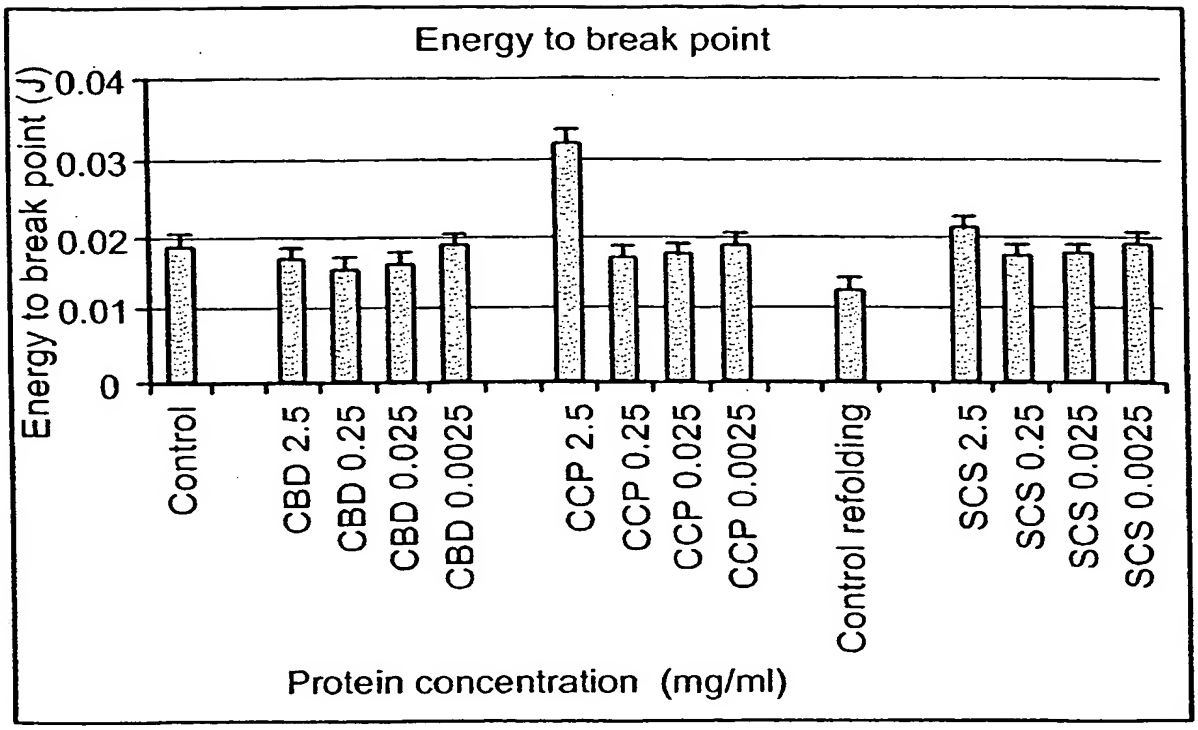


Fig. 15 Energy to break points of CBD CCP and SCS treated Whatman papers.

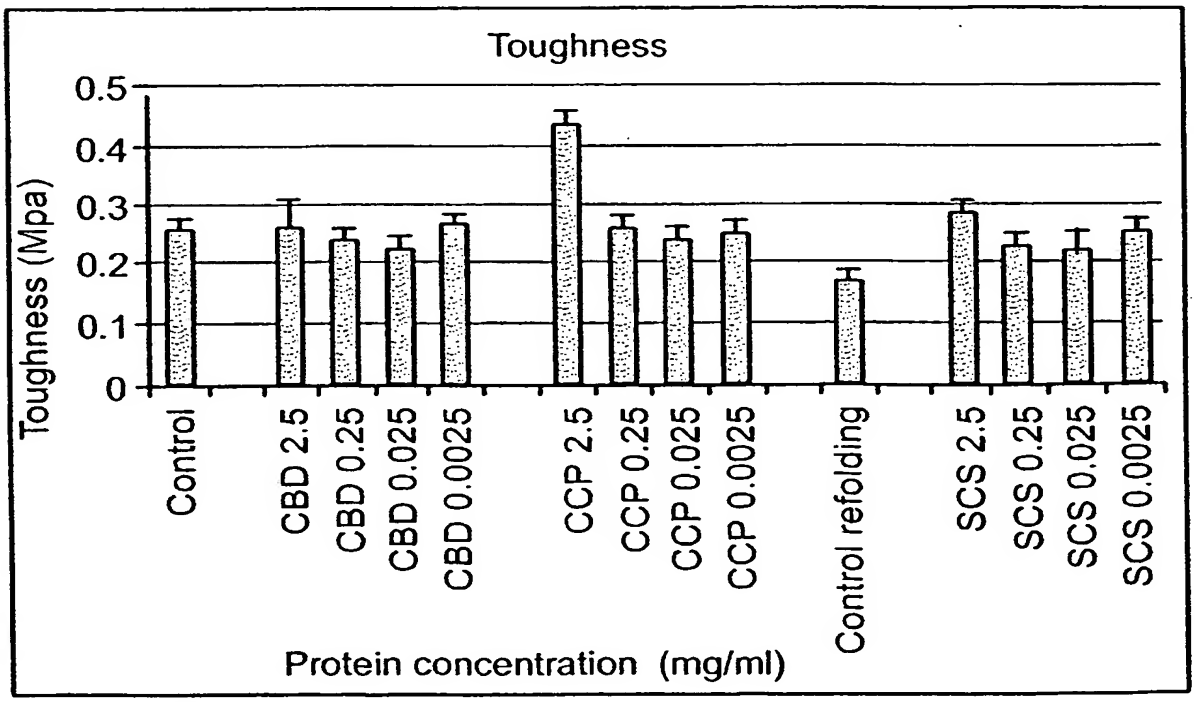


Fig. 16 Toughness of CBD CCP and SCS treated Whatman papers.

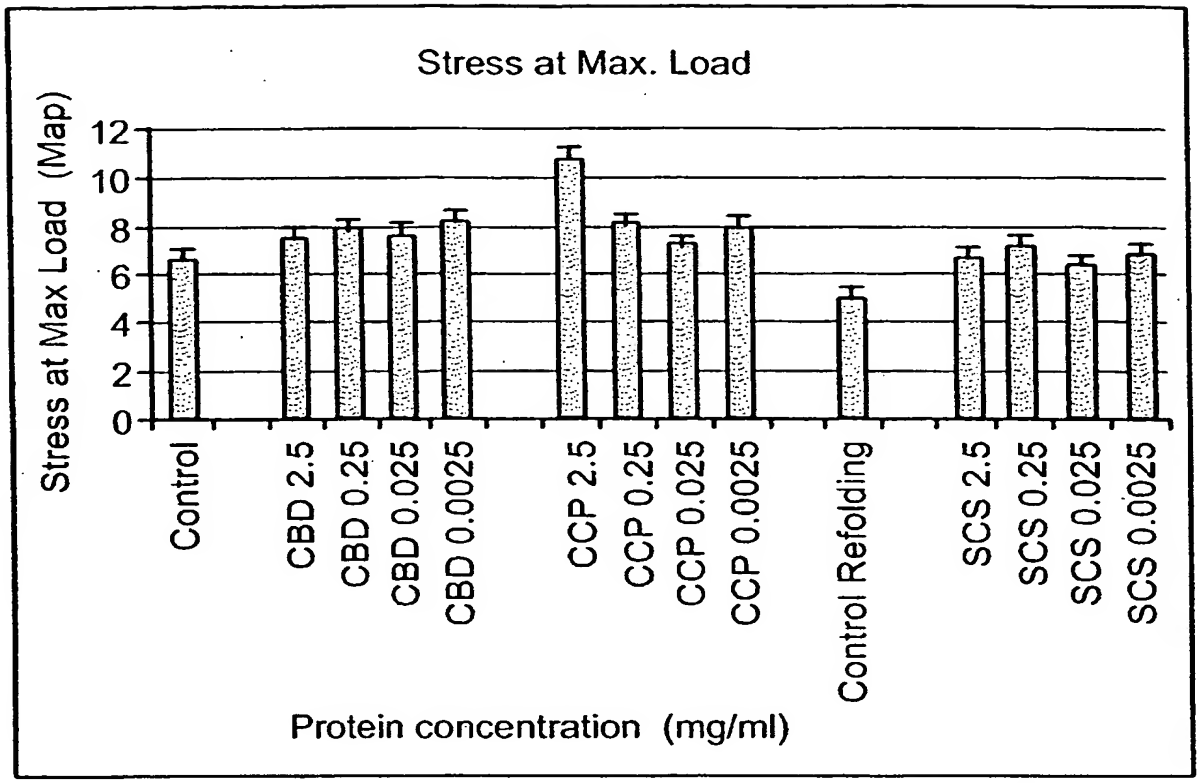


Fig. 17 Stress at maximum load of CBD CCP and SCS treated papers. All treatments increased the Stress at maximum load of Whatman papers, which demonstrates an increase to the strength of the paper.

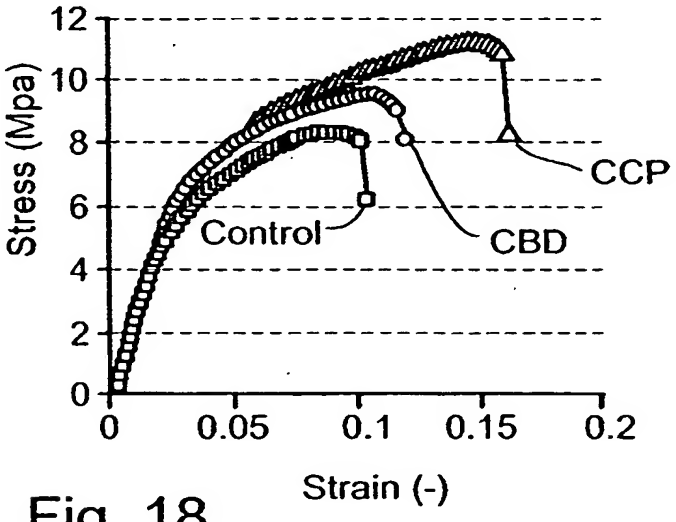


Fig. 18

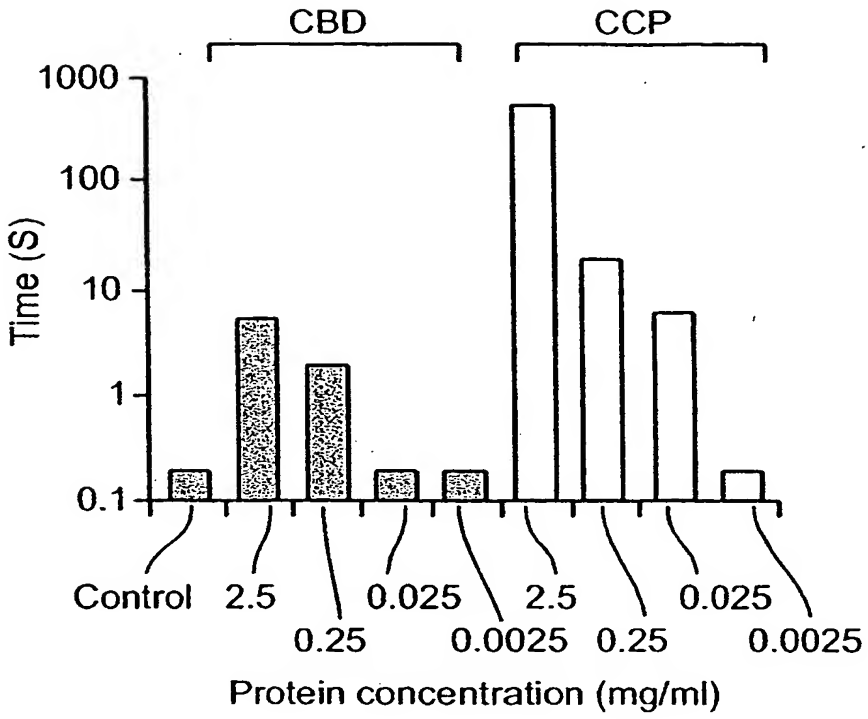

CBD
CCP
1000
100
10
1
0.1
Time (S)
Control
2.5
0.25
0.025
0.0025
2.5
0.25
0.025
0.0025
Protein concentration (mg/ml)

Fig. 19

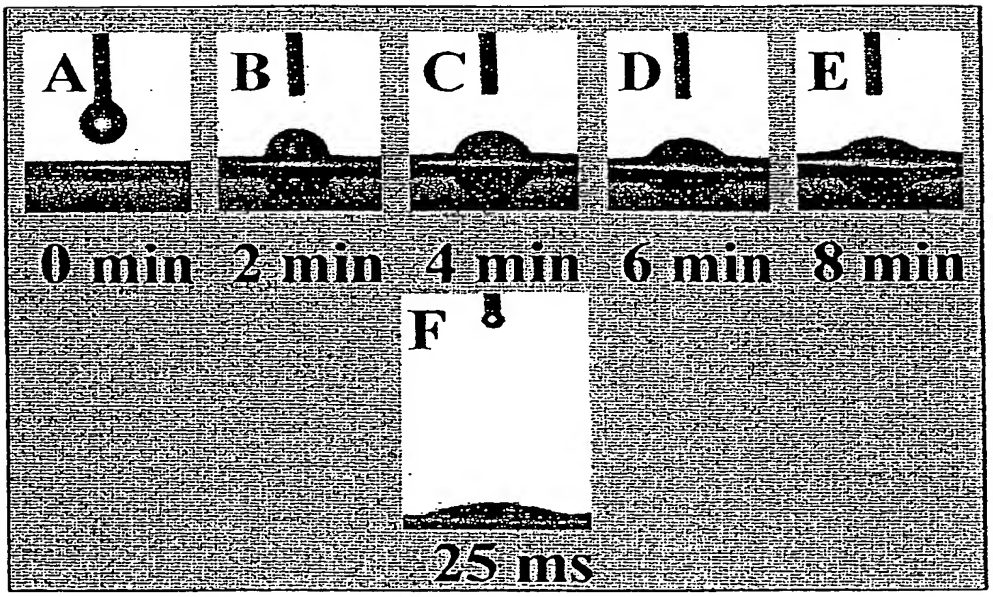

A
B
C
D
E
0 min
2 min
4 min
6 min
8 min
F
25 ms

Fig. 20